PRINT IN BINDING

UNITED STATES OF AMERICA:
WAR DEPARTMENT.

MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

FEBRUARY, 1888.

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PREPARED UNDER THE DIRECTION OF
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PUBLISHED BY AUTHORITY OF THE SECRETARY OF WAR.

WASHINGTON CITY:
SIGNAL OFFICE.
1888.

List of merchant marine steam and sailing vessels from which International Meteorological reports were received at the Office of the Chief Signal Officer, Army, Washington, D. C., in time to be used in the preparation of the Weather Review for the month of February, 1888.

	Name of vessel.	Captain.
Br.	s. s. Adriatic	Capt. J. G. Cameron.
Am.	Alamo	S. Risk.
Br.	Alps	T. M. McKnight.
	Ambrose	Edward Bisson.
Ger.	America	H. Heineke.
	Amsterdam	B. Bakker.
Br.	Anchoria	W. Brown.
	Arabic	W. M. Smith.
	Assyrian	J. Bentley.
	Athos	H. Low.
	Atlas	J. W. Tobin.
	Ayrshire	D. Jenkins
	Baltimore	J. Trenery.
	Barracouta	Robert Hubbard.
	Barrowmore	John Inch.
Belg.	s. s. Belgenland	W. A. Boynon.
Br.	Bengore Head	J. R. Brady.
	Bessel	Chas. J. Watson.
Ger.	Bohemia	R. Karlowa
Br.	Borderer	F. Manley.
	Breakwater	J. E. Dale.
	British King	John Kelly.
	British Princess	E. H. Freeth.
	Brooklyn City	W. Fitt.
	Bulgarian	E. Parry.
Ger.	California	O. Winkler.
Br.	Canada	J. Robinson.
Span.	Carolina	A. U. Galdo.
Br.	Carthaginian	A. McNicol.
	Cephalonia	Henry Walker.
	Cervin	Sinclair Hughson
Fr.	Chateau Lafite	Ollivier.
Am.	City of Augusta	J. W. Catherine.
Br.	City of Berlin	T. S. Land.
Am.	City of Para	L. Dexter.
	City of Washington	W. M. Rittig.
Br.	Claribel	Klinkokel.
Am.	Colorado	J. Daniel.
Br.	Dalton	J. Russell
	Denmark	R. S. Rigby.
Belg.	DeRuyter	J. J. Brarens.
Br.	Duke of Buckingham	T. C. Burnside.
	Durham City	D. D. Galbraith.
Br.	Earnmoor	R. Grey.
	Edith Goddon	T. H. Bennett.
	Egypt	J. Sumner.
	Egyptain Monarch	John Harrison
Ger.	Elder	H. Baur.
	Elbe	G. Meyer.
Am.	El Paso	H. S. Quick.
Ger.	Ems	Th. Jüngst.
Br.	England	T. P. Heeley.
	Erin	Wm. Tyson.
Span.	Espanol	S. de Fellerio.
Br.	Ethelbald	C. Smith
	Etruria	T. Cook.
	Euroka	R. B. Quick.
Nor.	Faedrelandet	A. C. Brunn.
Ger.	Fulda	R. Ringk.
Br.	Galileo	R. T. Jones.
	Gallia	M. Murphy.
Ger.	Gellert	W. Kuhlewein.
Br.	Germanic	D. Gleadell.
	Glucknuf	A. Buhner.
Ger.	Gothia	H. Bauer.
Br.	Grecian	C. E. LeGallais.
	Greece	A. J. Jeffrey.
Span.	Guido	J. M. Echevarria.
Br.	Helvetia	G. Cochran.
Ger.	Hermann	A. Kohlman.
	Hibernian	John Brown.
	Holland	Thos. Foote.
Am.	Hudson	H. B. Freeman.
	Indiana	W. J. Boggs.
Br.	Iowa	Sam. Walters.
	Iscia	W. Churnside.
Dan.	Island	W. Skjodt.

	Name of vessel.	Captain.
Br.	s. s. Istrian	Capt. T. H. Fox.
	Italy	Wm. Pearce.
Belg.	Jan Breydel	H. Meyer.
	Joshua Nicholson	C. H. Regnart.
Br.	Kansas	W. Gleig.
	Knickerbocker	F. Bemble.
	Komander Svend Foyn	J. Bryde.
Fr.	La Bourgogne	E. Franguel.
	La Champagne	L. Boyer.
Ger.	Lahn	H. Hellmers.
Br.	Lake Huron	M. L. Fraumar.
	Lake Nepignon	P. D. Murray.
Fr.	La Normandie	G. de Kersabiec.
Br.	Lake Ontario	H. Campbell.
	Lake Superior	W. Stewart.
Am.	Lampasas	M. B. Crowell.
Dtch.	Leerdam	G. Stenger.
Ger.	Lessing	H. Behrends.
Br.	Lord Clive	F. Urquhart.
	Lord Gough	E. M. Hughes.
	Lord O'Neil	J. A. Ferris.
Am.	Lorenzo D. Baker	Warren F. Wiley
	Louisiana	E. V. Gager.
Br.	Lydian Monarch	T. C. Huggett.
Am.	Manhattan	Frank Stevens.
Br.	Marcea	L. O. Moer.
	Maria	
	Marsala	N. Maas.
	Martello	W. Abbott.
	Maryland	A. H. Luckhorst.
	Mentmore	C. W. Simpson.
	Michigan	S. Walters.
	Mineola	T. L. Evans.
	Minnesota	R. J. Blackin.
	Montana	W. H. Williams
Belg	Nederland	A. J. Griffin.
Am.	New Orleans	T. P. C. Halsey.
	Nueces	J. Bolger.
	New York	Geo W. Mason.
Br.	Ohio	R. W. Sargent.
	Oregon	H. C. Williams.
	Oranmore	B. Jones.
	Orinoco	J. S. Garvin.
	Palestine	Whiteway.
	Pavonia	A. McKay.
	Pawnee	J. James.
Belg.	Pennland	Rud Weyer.
Br.	Pennsylvania	E. B. Thomas.
	Persian Monarch	R. N. Bristow.
Am	Philadelphia	Samuel Hess.
Belg.	Pieter de Coninck	E. Smit.
Ger.	Polaria	John Schade.
Br.	Pomona	J. Legoe.
	Procida	W. Bannon.
	Republic	P. J. Irving.
Ger.	Rhein	C. Topaer
Belg.	Rhynland	J. C. Jamison.
Br.	Richmond Hill	A. Hyde.
Am.	Rio Grande	Jas. F. Lewis.
Br.	Roman	E. Maddox.
	Rothiemay	C. Olsen.
Dtch.	Rotterdam	A. Potjer.
Br.	Roxbury Castle	A. Turpin.
Ger.	Rugia	A. Albers.
	Saale	H. Richter.
Br.	Saint Ronans	H. Campbell.
	Salerno	B. H. Rogers.
	Santiago	R. Potter.
	Sarmatian	Wm. Richardson
	Sarnia	J. Gibson.
	Saxmundham	F. M. Milne.
Dtch.	Schiedam	K. Mensonides.
Br.	Servia	H. McKay.
	Siberian	R. P. Moore.
	Spain	W. A. Griffiths.
	State of Georgia	G. Moodie.
	State of Indiana	A. Ritchie

	Name of vessel.	Captain.
Br.	s. s. State of Nebraska	Capt. A. G. Bra
	State of Nevada	J. A. Ste
	State of Pennsylvania	A. J. A.
	State of Texas	Gilbert W
	Stockholm City	W. Thom
Belg.	Switzerland	J. Ueber
Ger.	Taormina	G. W. Ko
Br.	The Queen	T. P. Hoo
Dan.	Thingvalla	S. T. H. L
Br.	Thornhill	James W
	Tomas Brooks	E. F. Ca
	Trinidad	W. J. Fra
	Umbria	W. McM
Belg.	Vaderland	C. H. Gra
Br.	Vancouver	C. J. Lin
	Virginian	M. Fitt.
Belg.	Waesland	H. Busch
Ger.	Werra	R. Busnin
Belg.	Westernland	Com. W. G. Ra
Ger.	Winston	Capt. W. Abbe
Br.	Wisconsin	E. Bentle
Ger.	Wyanoke	R. B. Bo
Br.	Wyoming	C. L. Rig
	Yorkshire	P. M. Ar
Dtch.	Zaandam	H. v. d. Z
	United States Naval.	
U. S. C. S.	A. D. Bache	J. F. Mo
U. S. C. S.	Blake	J. E. Pil
U. S. R. S.	Dale	Yates Sti
U. S. S.	Despatch	W. S. Co
U. S. R. S.	Franklin	G. C. Wi
U. S. S.	Galena	C. M. Ch
U. S. C. S.	Gedney	F. W. Cr
U. S. R. S.	Independence	J. W. Pl
U. S. S.	Jamestown	C. J. Tra
U. S. S.	Michigan	J. J. Hu
U. S. S.	Minnesota	Theo. F.
U. S. S.	New Hampshire	F. J. Hi
U. S. S.	Ossipee	W. B. He
U. S. S.	Powhattan	J. Jenkin
U. S. S.	Quinnebaug	W. M. Fo
U. S. S.	Richmond	Robert B
U. S. S.	Saratoga	C. H. Da
U. S. S.	St. Louis	Wm. Wh
U. S. S.	Yantic	O. F. He
U. S. R. S.	Wabash	J. N. Mi
	Sailing vessels.	
Am.	bg. Abbie Clifford	D. W. St
Br.	bkt. Ada Peard	N. Hock
	bk. Ada P. Gould	W. B. He
Am.	bk. Alice	W. G. Ba
It.	Angelica Accame	V. Niggi
Ger.	bk. Arnold von Bippen	J. T. Mi
Am.	bgt. Bonny Doon	Chas. Bu
Ger.	bk. Bremerhaven	H. Both
It.	bgt. Chioggia	Quintavo
Am.	bg. Daisy Boynton	C. Hardi
Am.	bk. Ethel	Wm. Th
	bk. Florence	A. P. Ca
	schr. Florence Rogers	J. S. F. M
	yacht Gittana	Ed. Sher
Am.	bkt. Harriet S. Jackson	W T. Ba
Am.	bk. Henry Warner	J. T. Pai
Am.	bg. John H. Crandon	W.T. Rich
	schr. John J. Hanson	L. J. Ste
	bkt. Josephine	Chas. Bro
Port.	bk. Julius	F. D. Vi
Am.	schr. Kensett	J. N. Sm
	bkt. Levanter	Geo. T. G
Am.	Light-ship No. 37	Andrew J
	schr. Orlando	Chas. Ku
	bk. Salina	John Pat
	sp Scholar	John Cor
	bk. Syra	E. H. Pat
	schr. T. W. Dunn	R. McFa
	Winnie Lowry	A. McR

UNITED STATES SIGNAL SERVICE

MONTHLY WEATHER REVIEW.

VOL. XVI. WASHINGTON CITY, FEBRUARY, 1888. No. 2.

INTRODUCTION.

This REVIEW treats generally the meteorological conditions of the United States and Canada for February, 1888, and is based upon the reports of regular and voluntary observers of both countries. Descriptions of the storms that occurred over the north Atlantic Ocean are also given, and their paths shown on chart i, on which also appears the distribution of field-ice and the limits of fog-belts west of the fortieth meridian. The weather over the ocean was unusually fine for the season, and the depressions traced were deficient in number and energy, when compared with the record of corresponding months of previous years. A noteworthy feature, unparalleled in the last six years, was an entire absence of icebergs in the vicinity of Newfoundland and the Grand Banks.

In the central and upper portions of the Mississippi valley the month was decidedly colder than the average, and the temperature was generally below the normal in all districts east of the Missouri Valley to the northward of the thirty-fifth parallel. In the Southern States, Rocky Mountain and Pacific coast regions, the mean temperatures were above the normal, the departures being unusually marked in northern Rocky Mountain districts, where they amounted to 10°.

In connection with the monthly precipitation, the most important feature was the large deficiency on the Pacific coast, in the lower lake region, Ohio and central Mississippi valleys, in which districts the precipitation fell short of the average from 25 to 65 per cent.

In this REVIEW are given extracts from the monthly reports of twenty state weather services, and also from the report of the New England Meteorological Society, the territory of the latter embracing the six New England states; this is the largest number of reports of local meteorological associations that have so far been received in time to be incorporated in the REVIEW.

In the preparation of this REVIEW the following data, received up to March 20, 1888, have been used, viz., the regular tri-daily weather-charts, containing data of simultaneous observations taken at 133 Signal Service stations and 24 Canadian stations, as telegraphed to this office; 177 monthly journals and 174 monthly means from the former and 24 monthly means from the latter; 307 monthly registers from voluntary observers; 60 monthly registers from United States Army post surgeons; marine records; international simultaneous observations; marine reports through the co-operation of the Hydrographic Office, United States Navy, and the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, Kansas, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, Nevada, New England, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, and Tennessee, and the Central Pacific Railway Company; trustworthy newspaper extracts, and special reports.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean pressure for February, 1888, determined from the tri-daily telegraphic observations of the Signal Service, is shown by isobarometric lines on chart ii.

The mean pressure for the month is greatest in the northern and central Pacific coast regions and in the adjacent portions of the plateau region, the area of maximum mean pressure being inclosed by the isobar of 30.15. The mean pressure is least in Arizona, New Mexico, and western Texas, and in the extreme northeastern Canadian Provinces, where the monthly barometric means fall to 30.0, or slightly below. Over much the larger part of the United States the mean pressures range from 30.05 to 30.1. The extreme monthly means are: highest, 30.18, at Fort Bidwell, Cal.; lowest, 29.98, at Sydney, N. S.

The departures from the normal pressure at the various Signal Service stations are given in the table of miscellaneous meteorological data. Although comparison of the mean pressure of the current month with the February normal shows a general deficiency over nearly the whole country, the departures are nowhere very marked, being less than .05 in all districts, except in the Gulf States and on the Atlantic coast south of Virginia, where they range from .05 to .10. On the north Pacific coast, and in northern New England, the mean pressure is slightly above the normal.

As compared with the mean pressure of the preceding month, an increase occurs along the north Pacific coast and in northeastern New England and the Maritime Provinces. In the first named district the increase ranges from .10 to .14 at stations near the coast, and in the latter, from .06 at Eastport, Me., to .19 at Sydney, N. S. In all other portions of the country the mean pressure of February is below that of January; over the entire region between the seventy-seventh and one hundred and seventeenth meridians the deficiency exceeds .10, and between the ninetieth and one hundredth meridians it amounts to .20, or more.

BAROMETRIC RANGES.

The monthly barometric ranges at the various Signal Service stations are also given in the table of miscellaneous meteorological data. The ranges, as usual, conform to the general rule, that is, they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In the states bordering on the Atlantic the extreme ranges are .43 at Key West, Fla., and 1.16 at Eastport, Me.; between the eightieth and ninetieth meridians, .59 at Cedar Keys, Fla., and 1.78 at Mackinaw City, Mich.; eastern slope of the Rocky Mountains, .79 at Fort Davis, Tex., and 1.23 at Poplar River, Mont.; plateau region, .49 at Yuma, Ariz., and .97 at Walla Walla and Spokane Falls, Wash.; Pacific coast, .45 at San Diego, Cal., and 1.39 at Port Angeles, Wash. In the upper lake region the ranges for February, 1888, exceed

the normal by about .40, while in New England they are about .40 less than the normal. In other districts the ranges differ but slightly from the normal.

AREAS OF HIGH PRESSURE.

During the month of February, 1888, seven areas of high pressure have passed over the region of observation. The centres of five of these areas were first located in the territory north of Montana and Dakota, and their general direction of movement was first to the southeast until over the central valleys, then in an easterly direction. Two areas were first observed in the central valleys.

The following is a brief description of each area, with the marked weather conditions prevailing during each:

I.—On the morning of the 1st this area was central over the Lake region, bounded by the isobar of 30.2, the highest central pressure being 30.36, at Green Bay, Wis. The movement of the area was easterly until central over western New York, then to the south until 10 p. m. of the 2d, when it passed to the ocean from the coast of North Carolina. The weather in all districts to the east of the ninety-second meridian during the 1st and 2d was fair, excepting in the southwest where rain, caused by the approach from the Gulf of an area of low pressure, was reported on the night of the 2d. Light winds prevailed, and only slight changes of temperature occurred.

II.—On the afternoon of the 2d the advance isobars of an area of high pressure extended over Montana, Dakota, and Minnesota. The area moved to the eastward, its centre remaining to the north of the region of observation until the night of the 3d, when it was central over Maine, with highest pressure, 30.46, at Eastport, Me., and at Boston, Mass. The area passed to the eastward of the Canadian Maritime Provinces after the 3 p. m. observation of the 4th. Light winds and generally fair weather accompanied this high pressure area in its movement to the eastward. On the night of the 3d and 4th it was accompanied by a cold wave which extended over New England and New York, the fall in temperature amounting to 20° in twenty-four hours.

III.—On the morning of the 4th an area of high pressure had extended over the northern slope of the Rocky Mountains and the upper Missouri valley, with central pressure, 30.44, at Q'Appelle. The track of the area was first to the southeast and then to the south. The pressure at the centre gradually decreased as the area moved to the southward, and on the morning of the 6th it had disappeared. On the night of the 4th and 5th a cold wave extended over eastern Dakota, Minnesota, Wisconsin, and Iowa, the fall in temperature ranging from 20° to 30°. The cold wave was greatly diminished in intensity as the area moved to the southward.

IV.—The approach of an area of high pressure from the northwest was indicated by increased readings of the barometer at stations in Manitoba on the afternoon of the 8th. At the succeeding observation the area had moved to the southeast and its centre was located to the north of Dakota. The movement continued to the southeast until central near La Crosse, Wis., when it was to the east. A cold wave over the middle and southern slopes of the Rocky Mountains, during which the fall in temperature ranged from 20° to 50°, occurred on the afternoon of the 9th, also a cold wave over New England on the night of the 9th and 10th, the fall in temperature ranging from 20° to 30°. Generally fair weather, with light winds, accompanied the area throughout its course.

V.—The approach of this high area was first apparent on the afternoon chart of the 13th, and its centre was located to the north of Dakota on the morning of the 14th. The pressure was highest on the morning of the 15th, when it was reported 31.04 at Prince Arthur's Landing; afterwards it gradually decreased until the afternoon of the 16th; when last observed the pressure at the centre was bounded by the isobar of 30.5. At 3 p. m. of the 15th the area of high pressure covered all of the United States to the east of the one hundred and seventh meridian, excepting New England. A cold wave, with front extending northeast and southwest, advanced with the high pressure area over the United States to the east of the Rocky Mountains, excepting the south Atlantic states, Florida, and Alabama. The fall in temperature ranged from 20° to 50° in twenty-four hours, and at several stations in the middle and southern slopes of the Rocky Mountains at 3 p. m. of the 14th the fall amounted to 35° in the previous eight hours.

VI.—On the night of the 20th over an extensive region embracing the Ohio Valley and Tennessee, the upper Mississippi and Missouri valleys, and the middle and southern slopes of the Rocky Mountains, the atmospheric pressure was slightly below the normal, being everywhere above 30.00 and highest in the lower Missouri valley, where a small area was inclosed by the isobar of 30.10. An area of low pressure was central north of Lake Ontario, an area of high pressure was central on the north Pacific coast region, and a low pressure area was over the Gulf of Mexico. The pressure increased over the central valleys and the area moved to the eastward until the morning of the 22d, when it was central over Lake Erie and the pressure had reached 30.40. From its position over Lake Erie it moved to the southeast and passed to the ocean on the morning of the 23d. Within this area fair weather and light winds prevailed, and it was accompanied in its movement by only a slight fall of temperature.

VII.—This high pressure area apparently developed over Illinois on the afternoon of the 23d. The pressure at the centre was at first but little above the normal, but as it moved to the northeast the pressure increased, and when last observed over New Brunswick the barometer at the centre was 30.42 at Chatham. It was attended by fair weather and a slight fall in temperature.

AREAS OF LOW PRESSURE.

Nine well-defined areas of low pressure have been traced during the month of February over the territory covered by the tri-daily observations. These tracks are very irregular as to direction, varying greatly from the usual course. Two of the areas first appeared off the coast of Louisiana and travelled in a northeasterly direction; four were first observed to the north of Montana; one on the north Pacific coast; one in southeast Colorado, and one on the north shore of Lake Superior. During the month no barometric depression passed over the middle Atlantic states south of New York, or over the south Atlantic states.

The following table shows the latitude and longitude in which each area was first and last observed, and the average rate of movement of each area in miles per hour:

Number of area.	First observed.		Last observed.		Average hourly velocity.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	*Miles.*
I	29 00	92 55	47 30	64 10	34.1
II	51 20	112 00	48 10	67 50	30.2
III	50 45	112 10	47 10	86 10	25.4
IV	48 30	123 30	47 30	77 00	58.2
V	49 20	87 10	44 15	65 55	47.5
VI	38 00	105 30	48 10	89 30	27.0
VII	51 35	114 00	47 10	90 00	28.4
VIII	28 00	92 30	49 00	65 30	27.9
IX	51 00	111 00	37 00	110 00	30.0

Average rate of progress, 33.2 miles per hour.

I.—This disturbance apparently developed over the Gulf of Mexico, to the south of Louisiana. It was at first limited in extent and of feeble energy, the central pressure being inclosed by the isobar of 29.9, but as it moved to the northeast it slowly expanded and increased in intensity. When last observed, 3 p. m. of the 5th, the lowest pressure was 29.48, at Chatham, N. B. The area was attended throughout its course by general rains or snows, light to fresh winds, and slightly higher temperature.

II.—This low pressure area was first observed on the afternoon of the 5th, extending from the region north of Montana to the southward, between two areas of high pressure, the one

central over Washington Territory and Oregon, the other central over Kansas. The pressure at the centre, at first but little below the normal, steadily decreased as the area moved to the southeast. On the morning of the 6th the lowest pressure was at Huron, Dak., and the storm began to move in a direction slightly to the north of east. It was last observed on the afternoon of the 8th, when it was central in the lower Saint Lawrence valley. It was attended by light snow or rains and brisk winds, becoming moderate gales over the Lake region on the 7th and 8th. The temperature rose slightly during the approach of the area, the greatest rise being in New England, where it amounted to 30° in twenty-four hours.

III.—A feeble depression was observed on the afternoon of the 6th, extending from the Northwest Territory to the southward along the Rocky Mountains. It moved to the southeast, and was central over Wyoming from 10 p. m. of the 6th till 3 p. m. of the 8th, when the movement toward the southeast was resumed. The area was very elongated in shape, its greatest length lying to the northwest and southeast. On the morning of the 9th the area had divided, one portion continuing to the southeast till central at New Orleans, La., then to the northeast, disappearing over Alabama on the morning of the 11th; the other portion remained, with slight change of position, over Colorado, Wyoming, and western Montana until the morning of the 12th, when apparently it had united with an area of low pressure then moving eastward from the north Pacific. Light local snows occurred over the northern and middle slopes of the Rocky Mountains from the 6th to 9th.

IV.—On the morning of the 12th an extensive area of low pressure, bounded by the isobar of 30.0, extended over the north Pacific region, the northern plateau, the northern slope, the Missouri Valley, and the upper Mississippi valley. The pressure was lowest (29.37) at Tatoosh Island, Wash. At the succeeding observation the area had divided. The eastern part moved to the southeast until 7 a. m. of the 13th, when it divided, one portion moving to the southward, disappearing over northern Texas, the other portion moving a little to the north of east, passing to the north of the region of observation. The western portion, without change of position, disappeared by gradual increase of pressure. The area was attended by heavy rains in the north Pacific region on the 12th, and by light snows, with light winds, over the Missouri valley, upper Mississippi valley, and the Lake region on the 13th.

V.—The existence of this depression was first apparent on the afternoon chart of the 16th. The centre was located to the north of Lake Superior, beyond the field of observation, and the southern portion only of the area extended over the Lakes. The disturbance moved rapidly southeastward, passing off the coast of Nova Scotia on the afternoon af the 17th. It was attended by gales of twenty-five to thirty-five miles on the Lakes on the afternoon and night of the 16th, and by light snows over the New England States on the 17th.

VI.—At 10 p. m. of the 17th an extensive area of low pressure was observed, reaching from the territory north of Montana, the pressure being least over Montana and the northern half of Wyoming and Dakota, while another depression of less extent and less energy was central over Colorado. Both areas moved to the southeast, the former increasing and the latter rapidly decreasing in pressure. At 3 p. m. of the 18th both depressions appeared as one area of low pressure with two centres, one of which was located in southwest Kansas and the other north of Dakota. After 10 p. m. of the 18th the movement of the south centre was to the northeast. On the morning of the 19th the north centre had entirely disappeared, and the area was in shape an ellipse with longest axis extending in a northeast and southwest direction. At 7 a. m. of the 20th it was central over northern Michigan, the lowest pressure, 29.24, being reported from Escanaba. From this position the movement of the area was more easterly, and it was last observed central in the lower Saint Lawrence valley, the pressure at the centre having increased 0.2. It was accompanied by rain or snow throughout its course, and by brisk winds, becoming high over the Lake region.

VII.—This area of low pressure was observed bearing down from the northwest over Montana at 10 p. m. of the 22d. It moved to the eastward, continuing to extend to southward, until the afternoon of the 24th, when it was central over western Lake Superior. At the succeeding observation it had apparently united with an area of low pressure moving from the Gulf of Mexico to the northeast, and at that time central over northern Indiana. The depression was of feeble energy and was unattended by any change in the weather conditions, excepting a slight rise in temperature.

VIII.—This disturbance approached the coast of Louisiana from the Gulf of Mexico and moved in a direction slightly to the west of north until central near Shreveport, La., at 10 p. m. of the 23d. From this position it moved to the northeast until central over Lake Huron and the pressure at the centre rapidly decreased to 29.2. From Lake Huron it moved to the eastward until central over Maine, then again to the northeast, the central pressure slowly increasing. It was accompanied by light rains or snows, slightly higher temperatures, and brisk winds, becoming strong gales over the Lakes from the 24th to the 26th.

NORTH ATLANTIC STORMS FOR FEBRUARY, 1888.

[*Pressure in inches and millimetres; wind-force by Beaufort scale.*]

The paths of the depressions that appeared over the north Atlantic Ocean during February, 1888, have been determined from international simultaneous observations by captains of ocean steamships and sailing vessels, received through the cooperation of the the Hydrographic Office, Navy Department, and the "New York Herald Weather Service."

Ten depressions have been traced, of which, seven passed eastward from the American continent north of the fortieth parallel; one developed between Bermuda and the coast of the United States; one first appeared northeast of Bermuda, and one apparently originated east of the Azores. Of the seven depressions which advanced from the American coast, three moved northeast beyond the region of observation west of the thirtieth meridian, and four passed south of east and disappeared south or southeast of the Banks of Newfoundland. One depression pursued an irregular course in the vicinity of Bermuda; one moved northeast from south of the Banks of Newfoundland, and one has been given a south of east track over southern Portugal.

In February, 1887, twelve depressions were traced, of which, six passed eastward over Newfoundland; one developed south of Nova Scotia, and five first appeared over mid-ocean. The depressions generally pursued east-northeast to northeast tracks, and in number and energy corresponded closely with the February average.

In February, 1888, the severest disturbances attended the passage of depression number 1, which moved northeast from south of the Banks of Newfoundland to the fifty-fifth parallel from the 1st to the 4th, inclusive. Of the remaining three depressions traced during the first decade of the month, number 3 alone exhibited marked energy, which, however, rapidly diminished with its advance southeastward from Newfoundland. From the 10th to the 13th, inclusive, fresh and strong north to west gales prevailed over the British Isles, attending the presence to the eastward or northeastward of an area of low barometric pressure. During the second decade four depressions of moderate energy appeared over the western portion of the ocean. Subsequent to the 20th two depressions moved eastward over northern Newfoundland, one of which, number 9, was accompanied by disturbances of considerable strength.

As compared with the corresponding month of previous years, the weather over the North Atlantic during February, 1888, was unusually fine; the depressions were deficient in number, and, as a whole, in energy.

In the following descriptions of the depressions traced, positions are given in degrees, latitude and longitude, except in cases where twenty-five to thirty-five minutes are cited, when they are shown in degrees and half degrees.

1.—This depression was central on the 1st in about N. 38°, W. 57°, whence it moved northeast to N. 43° 30′, W. 53° 30′, by the 2d, with pressure falling below 29.00 (736.6); by the 3d the storm-centre had advanced northeast to the fifty-first parallel, with slight changes in central pressure and strong to whole gales to the thirty-fifth parallel, and subsequent to the 4th disappeared north of the region of observation. The following report relative to this storm has been made by Mr. John Higgins, observer at Saint John's, N. F.: "2d, strong northeast gale set in 2 a. m., with sleet and snow, and raged all day; barometer at 11 p. m. 28.78 (731.0), and falling."

2.—This depression was central on the 1st in about N. 39°, W. 12°, whence it passed south of east over southern Portugal and Spain, without evidence of marked energy.

3.—This depression moved south of east from the Gulf of Saint Lawrence over Newfoundland during the 6th, and on the morning of the 7th was central in about N. 45°, W. 49°; by the 8th the storm-centre had passed southward to the thirty-eighth parallel, after which it apparently recurved to the northwest under the influence of depression number 4, which was central on the 9th over the Gulf of Saint Lawrence.

4.—This depression advanced south of east from the lower part of the Gulf of Saint Lawrence and passed over the Banks of Newfoundland during the 10th; after which it disappeared in the direction of the Azores, attended to the eastward of the fiftieth meridian by fresh to strong gales.

5.—This depression was central on the 12th off the southeast coast of Nova Scotia, whence it had advanced from the westward. During this date barometric minima falling to about 29.50 (749.3) were shown, and fresh to strong gales prevailed to the thirtieth parallel. By the 13th the storm-centre had moved eastward to the fiftieth meridian, with a decided increase in pressure, after which it disappeared to the eastward of the Grand Banks.

6.—This depression apparently originated to the westward of Bermuda, and on the 13th was central in about N. 35°, W. 69°, with fresh to strong gales over a considerable area; by the 14th the centre of depression had moved east-northeast to the sixty-fifth meridian, and by the 15th had passed slowly southeast to the sixty-third meridian, after which it recurved northward under the influence of depression number 7.

7.—This depression was central on the 15th off the west-southern coast of Nova Scotia, from which position it moved northeast over Newfoundland by the 16th; at noon, Greenwich time, of the 17th, the storm was central in about N. 50°, W. 47°, after which it disappeared north of the region of observation, attended by moderate to fresh gales.

8.—This depression developed off the American coast in about N. 40° on the 18th, and moved rapidly east to the fifty-sixth meridian by the 19th; by the 20th the storm-centre had advanced northeast to N. 49°, W. 41°, from whence it disappeared north of the fiftieth parallel. This storm possessed small energy.

9.—This depression was the continuation of a storm which advanced along the Saint Lawrence Valley during the 21st; by the 22d the depression was apparently central over the northern extremity of Newfoundland, and during the next two days it moved north of east to the fortieth meridian, accompanied by moderate to fresh gales; subsequent to the 24th the storm-centre recurved southward to the forty-fourth parallel, with a marked increase in energy, and disappeared north of the Azores after the 26th.

10.—This depression is given a probable east-northeast track from the Gulf of Saint Lawrence to the northeast of Newfoundland from the 27th to the 29th, inclusive, during which period fresh to strong gales prevailed over the ocean south of Nova Scotia and Newfoundland.

FOG.

The limits of fog-belts to the westward of the fortieth meridian are shown on chart i by dotted shading.

As compared with the chart of the preceding month, January, 1888, the southern limit of the Newfoundland fog-belt has extended about one degree, while to the westward of the Grand Banks the southern limit of fog remains about the same. As regards frequency of occurrence, there has been a large increase in the number of fog-areas reported, more particularly in the region south of Nova Scotia and off the coast of the United States. On the seventeen dates for which fog was reported near Newfoundland its development, in each instance, attended the circulation of winds in the eastern and southern quadrants of areas of low barometric pressure which were advancing from the westward. Fog was reported south of Nova Scotia on eight dates, during each of which areas of low pressure were passing eastward over the Gulf of Saint Lawrence. On eleven dates for which fog was reported along the coast of the United States it originated, as a rule, with south to east winds preceding the approach over the continent of centres of areas of low pressure.

The following are the limits of fog-areas on the north Atlantic Ocean during February, 1888, as reported by shipmasters:

Date.	Vessel.	Entered.			Cleared.		
		Lat. N.	Lon. W.	Time.	Lat. N.	Lon. W.	Time.
		° ′	° ′		° ′	° ′	
1	S. S. Rugia	45 16	50 35	4 a. m.	45 40	49 00	10 a. m.
1	S. S. Erin	43 24	48 40	.....	43 13	50 17	
1-2	S. S. Salerno	47 20	45 51	3 a. m.	44 34	51 51	0.30 p. m.
2	S. S. Rhaetia	46 10	47 40	1.30 a. m.	45 05	51 30	2 p. m.
4-5	S. S. Wyanoke	36 58	75 10	8 p. m.	39 40	74 30	5.20 p. m.
5	S. S. Nederland	39 24	73 00	4.22 a. m.	38 48	74 36	5 p. m.
5	S. S. Philadelphia	35 53	72 55	.....	36 13	73 03	
5	S. S. Gallia	40 41	66 47	.....	40 47	63 59	
5-6	S. S. LaNormandie	41 15	65 15	11 a. m.	40 45	70 15	2 a. m.
5-6	S. S. LaChampagne	41 11	65 36	.....	45 31	52 22	
6	S. S. Iowa	44 58	54 00	12.30 a. m.	43 40	58 00	2 p. m.
6-7	S. S. Buffalo	46 45	46 30	4 a. m.	45 50	51 29	8 a. m.
6-7	S. S. City of Richmond	42 27	46 00	5 p. m.	45 53	51 24	10 a. m.
7	S. S. Catalonia	44 50	45 29	6 a. m.	43 35	49 01	9 p. m.
7-8	S. S. Alvo	37 40	74 12	Midnight.	New York.		
7-8	S. S. Indiana	47 15	42 27	10.57 p. m.	46 46	43 56	4.57 a. m.
8	S. S. Rhein	37 32	73 15	2 a. m.	37 27	73 40	4 a. m.
8	S. S. Iowa	43 07	67 55	6.15 a. m.	42 20	70 55	7.45 p. m.
8	S. S. Pennland	45 10	49 20	Noon.	45 40	48 00	5 p. m.
8	S. S. Venetian	43 08	62 51	11 a. m.	42 40	67 50	Midnight.
8	Fog at Saint John's, N. F.						
8-9	S. S. City of Richmond	43 16	60 19	10 p. m.	42 54	61 29	2 a. m.
8-9	S. S. Mentmore	45 30	43 40	Midnight.	42 30	49 26	Midnight.
9	S. S. Indiana	44 42	60 31	5.22 a. m.	44 33	50 57	7.24 a. m.
10	S. S. Marengo	47 08	45 08	9 a. m.	46 43	46 24	3.10 p. m.
11	Schr. John T. Hansen	39 20	73 00	7 a. m.	38 25	73 50	2 p. m.
11	S. S. Moravia	40 57	66 00	6 a. m.	40 46	69 00	6 p. m.
11	S. S. Etruria	40 59	67 34	.....	40 37	70 20	
12-13	S. S. Hudson	35 15	75 18	2 a. m.	33 43	77 30	4 a. m.
13	S. S. Schiedam	44 25	46 40	9 a. m.	43 52	48 45	8 p. m.
15	Fog at Saint John's, N. F.						
15	S. S. Nederland	43 05	53 05	8 a. m.	43 30	51 27	6 p. m.
15	S. S. Duke of Buckingham	46 49	48 34	.....	45 16	53 12	
15	S. S. Ohio	42 50	58 33	Noon	42 25	60 50	9 p. m.
15	S. S. Scandinavian	42 42	61 28	3 a. m.	42 39	63 41	1 p. m.
16	S. S. Jan Breydel	44 54	50 48	.....	44 47	51 32	
16	S. S. Herman	46 18	47 25	.....	45 40	50 05	
16-17	S. S. Vaderland	46 11	47 06	.....	45 27	50 45	
17	S. S. Duke of Buckingham	43 24	60 07	.....	43 08	60 43	
19	S. S. Santiago	48 40	47 20	6 a. m.	48 39	48 15	10 a. m.
20	S. S. Duke of Buckingham	37 04	75 30	.....	Cape Henry.		
21	S. S. Bengore Head	40 55	66 34	Noon	40 50	67 00	2 p. m.
21	S. S. Hermann	37 23	74 51	.....	37 05	75 16	
21	S. S. City of Washington	35 30	75 00	8 a. m.	36 01	75 00	11.30 a. m.
21-22	S. S. Polaria	44 50	50 30	.....	44 10	53 06	
23	S. S. LaChampagne	43 47	48 49	6.30 a. m.	43 24	49 52	10.30 a. m.
25	S. S. Polaria	40 52	68 30	.....	40 38	70 13	
25-26	S. S. Umbria	Off Fire Island.					
25-26	S. S. LaChampagne	40 35	70 07	.....	40 26	66 05	
25-26	S. S. Breakwater	37 52	75 00	.....	Sandy Hook.		
26	S. S. Egypt	41 02	66 22	.....	40 36	68 24	
26	S. S. Wyanoke	38 30	75 15	5.30 a. m.	38 55	75 00	8.30 a. m.
26-27	S. S. Durham City	42 30	64 00	3 p. m.	42 38	65 40	3 a. m.
27	S. S. Stockholm City	44 55	49 20	.....	44 44	50 13	
27-28	S. S. Palestine	44 30	52 30	10 p. m.	44 27	53 50	2.30 p. m.
27-28	S. S. Richmond Hill	46 30	44 30	9 a. m.	45 40	48 20	1 a. m.
28	S. S. Republic	43 15	49 12	5.55 p. m.	43 00	49 45	
28	S. S. Rugia	43 04	48 40	10.30 a. m.	42 40	51 50	7 p. m.
28	Fog at Saint John's, N. F.						

OCEAN ICE.

The following table shows the southern and eastern limits of

the region within which icebergs or field ice were reported for February during the last six years:

Southern limit.			Eastern limit.		
Month.	Lat. N.	Long. W.	Month.	Lat. N.	Long. W.
	° ′	° ′		° ′	° ′
February, 1883	42 01	52 46	February, 1883	46 19	45 44
February, 1884	42 00	50 00	February, 1884	46 50	43 45
February, 1885	41 50	51 12	February, 1885	47 52	42 00
February, 1886	46 10	47 15	February, 1886	48 00	44 47
February, 1887	40 00	48 00	February, 1887	46 26	41 50
February, 1888	44 59	45 08	February, 1888	44 59	45 08

From the above it will be seen that during February, 1888, ice was encountered about 3° north and 1° west of the average southern and eastern limits for the month, as determined from observations taken during the preceding five years.

Field ice has been reported for February, 1888, as follows: 9th, ice drove in the harbor of Saint John's, N. F., and on the 11th heavy ice prevented vessels from entering that port; 13th, drift ice reported close in on the land off the southeast coast of Newfoundland; 17th, s. s. "Bengore Head" encountered ice from N. 47° 16′, W. 51° 53′ to N. 45° 58′, W. 52° 50′; 19th, 21st, 26th, and 28th, ice reported off the south and southeast coasts of Nova Scotia; 28th, the s. s. "Toledo" passed a quantity of loose ice in N. 44° 59′, W. 45° 08′. In January, 1888, two icebergs were reported over the Banks southeast of Saint John's, N. F.

No icebergs have been reported for February, 1888. This fact constitutes a noteworthy feature which is unparalleled in the six-year February ice-record of this office. The quantity of field ice reported was also largely deficient, when compared with the average for the month.

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for February, 1888, is exhibited on chart ii by dotted isothermal lines. In the table of miscellaneous data are given the monthly mean temperatures, with the departures from the normal, for the various stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature, precipitation, and departures from the normal, show respectively the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal, and subtracting when above.

East of the Mississippi River and north of the thirty-fifth parallel the mean temperatures were normal or below. In the extreme northwest, Ohio Valley, and south Atlantic states the mean temperature did not differ more than 0°.2 from the normal, and in New England it amounted to only 0°.8. The greatest deficiency in the monthly mean temperature occurred in the upper Mississippi valley, where it averaged nearly 4°; in the upper lake region the deficiency amounted to 2°.5.

In the Gulf States, Missouri Valley, Rocky Mountain and Pacific coast districts, except in southern California (where the temperature was nearly normal), the month was decidedly warmer than the average, the excess over the normal temperature amounting to more than 4° over the greater part of the area embraced by the districts named, and ranging from 6° to 10° in the northern and central Rocky Mountain regions.

The following are the most marked departures from normal temperatures at Signal Service stations:

Above normal.		Below normal.	
	°		°
Helena, Mont	11.0	La Crosse, Wis	5.4
Denver, Colo	7.6	Davenport, Iowa	5.2
Boisé City, Idaho	7.3	Marquette, Mich	5.0
Cheyenne, Wyo	6.9	Chicago, Ill	5.0
Dodge City, Kans	6.7	Springfield, Ill	4.7
Salt Lake City, Utah	6.5	Saint Paul, Minn	4.6
North Platte, Nebr	6.5	Dubuque, Iowa	4.2
Fort Custer, Mont	6.3	Port Huron, Mich	3.9

Chart iii shows for certain Signal Service stations curves representing current and normal February temperatures for each day of the month.

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperatures for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for February, 1888; (4) the departures of the current month from the normal; (5) and the extreme monthly means for February during the period of observations and the year of occurrence:

State and Station.	County.	(1) Normal for the month of Feb.	(2) Length of record.	(3) Mean for February, 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for February.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
Arkansas.		°	Years	°	°	°		°	
Lead Hill	Boone	39.5	6	41.1	+1.6	49.7	1882	32.2	1885
California.									
Sacramento	Sacramento	49.6	22	47.9	−1.7	55.9	1870	43.2	1883
Salinas	Monterey	47.6	16	50.3	+2.7	52.6	1881	40.0	1884
Florida.									
Merritt's Island	Brevard	64.8	5	64.8	0.0	69.5	1887	60.2	1886
Illinois.									
Golconda	Pope	38.0	9	35.3	−2.7	.....	.....	.....	.....
Greenville	Bond	32.4	9	29.8	−2.6	.....	.....	.....	.....
Peoria	Peoria	29.3	32	28.4	−0.9	.....	.....	.....	.....
Prairieville	Lee	25.1	33	20.1	−5.0	.....	.....	.....	.....
Riley	McHenry	21.8	27	17.5	−4.3	.....	.....	.....	.....
Sandwich	De Kalb	22.4	38	23.8	+1.4	.....	.....	.....	.....
Indiana.									
Logansport	Cass	28.5	34	28.4	−0.1	42.2	1882	22.0	1872
Spiceland	Henry	27.0	34	30.5	+3.5	.....	.....	.....	.....
Vevay	Switzerland	35.9	21	33.8	−2.1	.....	.....	.....	.....
Iowa.									
Cresco	Howard	15.7	16	12.9	−2.8	.....	.....	.....	.....
Monticello	Jones	21.4	34	18.1	−3.3	34.6	1878	7.5	1875
Kansas.									
Lawrence	Douglas	32.0	21	32.7	+0.7	41.6	1882	20.8	1885
Wellington	Sumner	36.7	10	39.0	+2.3	40.1	1882	24.6	1885
Yates Centre	Woodson	29.8	8	34.7	+4.9	39.6	1882	21.1	1885
Louisiana.									
Point Pleasant	Tensas	49.8	7	51.6	+1.8	.....	.....	.....	.....
Maine.									
Gardiner	Kennebec	20.5	52	21.3	+0.8	.....	.....	.....	.....
Maryland.									
Cumberland	Alleghany	32.8	16	32.8	0.0	38.0	1877 '82	25.0	1875
Massachusetts.									
Somerset	Bristol	27.4	18	28.6	+1.2	.....	.....	.....	.....
Newburyport	Essex	26.5	9	26.4	−0.1	30.5	1880 '84	19.3	1885
Michigan.									
Thornville	Lapeer	24.6	12	22.5	−2.1	.....	.....	.....	.....
Kalamazoo	Kalamazoo	25.4	13	22.8	−2.6	.....	.....	.....	.....
Adrian	Lenawee	26.9	10	23.4	−3.5	.....	.....	.....	.....
New Hampshire.									
Concord	Merrimac	24.3	17	23.0	−1.3	32.7	1880	14.3	1875
New Jersey.									
South Orange	Essex	29.8	18	29.4	−0.4	34.3	1877	22.8	1885
Moorestown	Burlington	31.2	25	32.1	+0.9	37.2	1865	21.6	1885
New York.									
Palermo	Oswego	21.3	35	19.8	−1.5	27.8	1854	12.7	1875
Ohio.									
North Lewisburg	Champaign	30.5	57	31.2	+0.7	.....	.....	.....	.....
Wauseon	Fulton	25.6	18	24.7	−0.9	35.4	1882	11.3	1875
Oregon.									
Albany	Linn	40.3	9	44.3	+4.0	47.0	1885	32.7	1887
Pennsylvania.									
Dyberry	Wayne	22.5	24	20.9	−1.6	29.3	1867	13.6	1868, '75,
Grampian Hills	Clearfield	24.6	24	25.5	+0.9	.....	.....	.....	[1885
Wellsborough	Tioga	24.5	11	26.3	+1.8	30.3	1884	22.3	1877
South Carolina.									
Stateburg	Sumter	50.9	8	49.8	−1.1	55.2	1884	41.8	1885
Tennessee.									
Milan	Gibson	41.0	6	41.2	+0.2	.....	.....	.....	.....
Texas.									
New Ulm	Austin	56.3	16	55.5	−0.8	61.9	1882	52.6	1883
Strafford	Orange	18.7	13	17.4	−1.3	25.7	1877	11.0	1885
Virginia.									
Bird's Nest	Northampt'n	41.9	19	40.0	−1.9	47.8	1880	34.8	1875
Dale Enterprise	Rockingham	35.0	8	41.4	+6.4	42.4	1883	23.9	1885
Variety Mills	Nelson	38.6	11	37.8	−0.8	43.4	1884	29.6	1885
Wytheville	Wythe	37.0	24	40.0	+3.0	43.0	1884	30.0	1885
West Virginia.									
Helvetia	Randolph	35.5	12	37.2	+1.7	42.0	1887	25.7	1885

Table of comparative maximum and minimum temperatures for February.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
		°	°	°		°		Yrs.
Alabama	Mobile	75.3	30.0	80.5	1887	19.3	1886	18
Do	Montgomery	69.8	24.8	81.2	1883	14.4	1886	16
Arizona	Prescott	63.2	22.5	80.0	1879	−11.0	1880	12
Do	Fort Apache	68.1	23.9	74.0	1881	− 9.0	1880	10
Arkansas	Fort Smith	69.8	16.5	78.4	1883	1.0	1885	6
Do	Little Rock	75.0	18.0	77.0	1882	7.6	1880	9
California	San Francisco	76.3	41.9	71.0	1886	33.1	1887	17
Do	San Diego	66.8	42.5	82.6	1883	35.0	1880	17
Colorado	Denver	70.5	15.5	72.0	1879	−22.0	1883	16
Do	Montrose	56.6	15.9	59.0	1887	2.3	1887	4
Connecticut	New Haven	48.7	− 1.5	65.0	1880	− 7.7	1886	16
Do	New London	50.0	− 0.6	62.0	1880	− 6.0	1871	15
Dakota	Fort Buford	49.2	−27.8	57.0	1882	−41.2	1887	10
Do	Yankton	55.8	−19.4	68.0	1876	−24.8	1886	15
Dis. of Columbia	Washington City	61.0	12.6	78.0	1874	− 2.3	1886	18
Florida	Jacksonville	81.7	32.5	83.6	1887	24.3	1886	17
Do	Key West	80.5	58.8	87.0	1874	52.3	1886	18
Georgia	Atlanta	68.0	13.0	74.5	1883	8.0	1885	10
Do	Savannah	72.0	27.0	80.0	1883	19.0	1886	18
Idaho	Boisé City	63.8	24.0	65.2	1880	−12.0	1883	11
Illinois	Cairo	65.5	9.5	74.0	1883	− 2.6	1886	17
Do	Chicago	47.2	−17.5	63.0	1880	−13.7	1885	16
Indiana	Indianapolis	59.8	− 2.1	72.0	1883	− 9.0	1885	15
Indian Ter	Fort Sill	74.8	18.8	79.0	1879, 1880	− 3.5	1883	11
Iowa	Dubuque	51.0	−23.0	67.2	1882	−31.0	1875	15
Do	Des Moines	57.2	−20.6	68.0	1880	−23.0	1883	10
Kansas	Dodge City	78.3	4.5	78.0	1876	−20.0	1883	14
Do	Leavenworth	62.9	− 8.0	73.0	1876	−16.2	1885	17
Kentucky	Louisville	66.8	8.0	77.9	1887	− 1.3	1885	16
Louisiana	New Orleans	78.7	35.0	81.5	1887	25.0	1886	18
Do	Shreveport	74.8	32.5	80.5	1876	14.6	1885	15
Maine	Eastport	45.8	− 8.3	48.6	1886	−30.0	1876	15
Do	Portland	43.9	− 7.0	58.0	1880	−10.2	1886	17
Maryland	Baltimore	59.9	11.1	78.0	1874	− 1.1	1886	16
Massachusetts	Boston	56.0	− 4.0	64.0	1880	− 6.6	1886	18
Michigan	Marquette	40.2	−26.6	69.0	1877	−37.0	1875	13
Do	Grand Haven	43.7	− 7.0	58.0	1880	−34.0	1875	10
Minnesota	Saint Vincent	39.0	−49.9	49.5	1886	−79.2	1885	8
Do	Saint Paul	45.3	−33.0	59.0	1880	−32.0	1875	17
Mississippi	Vicksburg	74.0	28.0	83.1	1883	16.0	1886	16
Missouri	Saint Louis	62.8	− 3.5	74.1	1887	− 7.9	1886	18
Montana	Ft. Assiniboine	49.2	−21.8	63.2	1886	−55.4	1887	9
Do	Helena	56.5	− 1.0	62.1	1886	−40.5	1887	8
Nebraska	North Platte	67.8	− 4.2	68.3	1882	−22.2	1885	14
Do	Omaha	62.5	−17.2	66.0	1880	−24.9	1883	16
Nevada	Winnemucca	62.9	−16.6	69.0	1879	−19.5	1883	10
New Jersey	Atlantic City	55.2	2.7	71.0	1880	− 5.0	1875	15
New Mexico	Santa Fé	55.0	16.0	75.0	1879	− 3.0	1879, 1880	16
New York	Buffalo	51.2	− 8.0	63.8	1883	−13.0	1875	16
Do	New York City	54.8	3.0	69.0	1874	− 4.0	1873	17
North Carolina	Charlotte	70.0	15.5	76.5	1883	5.9	1886	10
Do	Wilmington	72.0	24.6	81.0	1880	10.0	1886	18
Ohio	Cincinnati	61.2	5.6	73.0	1883	− 9.6	1885	18
Do	Sandusky	53.1	− 3.0	70.0	1883	−14.9	1885	11
Oregon	Portland	60.8	30.0	65.0	1886	7.0	1883	15
Do	Roseburg	67.2	28.2	72.1	1886	3.3	1884	11
Pennsylvania	Pittsburg	61.1	1.1	76.5	1883	−10.0	1875	15
Do	Philadelphia	58.5	2.5	73.0	1874	− 2.4	1886	18
Rhode Island	Block Island	48.8	0.9	54.1	1887	− 1.0	1886	9
South Carolina	Charleston	71.8	27.5	80.4	1887	13.3	1886	13
Tennessee	Knoxville	67.0	9.1	79.0	1871	− 4.1	1886	18
Do	Memphis	71.0	21.0	79.0	1883	5.8	1886	16
Texas	Brownsville	83.9	45.9	85.0	1876	27.0	1883	13
Do	Fort Elliott	78.0	9.4	78.0	1880	−10.0	1883	9
Utah	Salt Lake City	58.7	23.5	68.0	1879	−13.0	1884	14
Virginia	Lynchburg	66.0	11.3	75.0	1874	1.3	1886	15
Do	Norfolk	68.7	17.2	81.0	1871	3.5	1886	18
Washington	Spokane Falls	58.0	22.0	55.3	1886	−25.1	1883	8
Do	Olympia	59.0	29.0	61.0	1886	2.0	1884	11
Wisconsin	La Crosse	48.0	−28.0	65.0	1882	−34.0	1875	16
Do	Milwaukee	45.3	−20.7	60.0	1882	−23.6	1885	18
Wyoming	Cheyenne	56.2	7.5	63.2	1886	−28.2	1884	15

RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data. In the extreme northwest, upper Mississippi and Missouri valleys the monthly ranges generally varied from 70° to 85°; along the Gulf and Pacific coasts they were less than 40°, being below 30° at most stations.

In the table below are given some of the greatest and least monthly ranges for February, 1888, with the maximum ranges for any month since the establishment of station:

Stations.	For February, 1888.	Greatest in any month since establishment of station.	Length of record, years.	Stations.	For February, 1888.	Greatest in any month since establishment of station.	Length of record, years.
	°	°			°	°	
Saint Vincent, Minn	88.9	99.3	8	Tatoosh Island, Wash	16.4	41.4	5
Moorhead, Minn	85.0	93.5	8	Key West, Fla	21.7	46.0	18
Duluth, Minn	82.5	80.4	18	Fort Canby, Wash	21.2	44.3	5
Davenport, Iowa	80.1	73.0	17	Astoria, Oregon	22.0	.....	....
Omaha, Nebr	79.7	93.2	18	Port Angeles, Wash	23.1	42.0	4
Fort Totten, Dak	79.1	93.2	4	San Diego, Cal	26.3	55.0	18
Concordia, Kans	76.9	96.5	4	Olympia, Wash	30.0	57.8	11
Saint Paul, Minn	76.3	90.7	18	San Francisco, Cal	34.4	50.3	17

From the above table it will be seen that the monthly ranges at Duluth, Minn., and Davenport, Iowa, for February, 1888, are the greatest that have yet occurred at those stations. The greatest monthly range of temperature shown by records of the Signal Service, is 117°, which occurred at Fort Benton, Mont., in December, 1880.

FROST.

It is not considered of sufficient importance to give a detailed statement of the occurrence of frost in the Northern States. In Southern States, where the monthly mean temperatures generally ranged above 50°, frost occurred as follows:

Alabama.—8th, 9th, 12th, 13th, 14th, 26th to 29th.
Arizona.—2d to 9th, 11th to 14th, 19th to 25th, 27th.
Arkansas.—6th, 8th, 12th, 13th, 16th, 19th to 25th, 27th.
California.—1st to 10th, 15th to 20th, 22d to 25th, 27th to 29th.
Florida.—14th, 20th, 26th to 29th.
Georgia.—9th, 13th, 14th, 17th, 18th, 26th to 29th.
Louisiana.—8th, 12th to 14th, 17th, 19th, 25th to 29th.
South Carolina.—1st to 3d, 9th, 13th to 19th, 26th to 29th.

The most southerly stations reporting frost were as follows: Mobile, Ala., 27th; Fort Huachuca, Ariz., 3d, 5th, 8th, 20th, 21st; Riverside, Cal., 2d, 3d, 5th, 7th, 8th, 20th, 24th; Archer, Fla, 14th, 28th, 29th; Cedar Keys, Fla., 28th; Quitman, Ga., 28th, 29th; New Orleans, La., 27th, 28th; Abbeville, La., 28th; Biloxi, Miss., 28th.

TEMPERATURE OF WATER.

The following table shows the temperature of the sea-water for February, 1888, observed, under conditions as given, at the harbors of the several stations; the monthly range of water temperature; the average depth at which the observations were made, and the mean temperature of the air:

Station.	Temperature at bottom.				Mean temperature of air at the station.	Average depth of water in feet and tenths.
	Max.	Min.	Range.	Monthly mean.		
	°	°	°	°	°	
Canby, Fort, Wash	47.5	40.5	7.0	44.1	43.3	14.8
Cedar Keys, Fla	70.3	56.0	14.3	64.3	61.7	7.9
Charleston, S. C	56.0	49.5	6.5	53.4	54.0	34.2
Eastport, Me	35.5	32.6	2.9	33.3	22.6	16.0
Galveston, Tex	61.7	55.7	6.0	58.9	58.8	14.8
Key West, Fla*	79.0	69.0	10.0	75.1	72.4	18.1
New York City	36.6	31.0	5.6	32.0	31.6	13.0
Pensacola, Fla	65.4	53.2	12.2	61.0	58.9	17.3
Portland, Me	32.6	29.4	3.2	30.7	23.2	15.7
Portland, Oregon	46.0	40.7	5.3	43.6	44.0	35.8

* Record for 27 days.

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for February, 1888, as determined from the reports of about eight hundred stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departures from the normal. The figures opposite the names of the geographical districts in columns for mean temperature, precipitation, and departures from the normal, show respectively the average for the several districts. The normal for any district may be found by adding the departure to the current

mean when the precipitation is below the normal, and subtracting when above.

In the Missouri Valley and the northern and middle slopes the precipitation was normal; in the southern slope, Canadian Maritime Provinces, south Atlantic and the east Gulf states it was decidedly above normal, and in all other districts there was a deficiency. In the east Gulf states the rainfall amounted to 66 per cent. more than the average, and in the south Atlantic states, 25 per cent., while in northern Florida and the southern slope the precipitation was more than double the average. In the west Gulf states there was a deficiency amounting to nearly 20 per cent. of the average; in this district, however, there was a large excess on the eastern Texas and Louisiana coasts, while a very large deficiency occurred in the northern portion. In the lower lake region and lower Ohio valley there was less than half of the normal February precipitation; in New England and the middle Atlantic states it amounted to about 75 and 90 per cent., respectively, of the normal. On the Pacific coast there was slightly less than half the average amount of rain in Washington and Oregon and only about one-third of the average in California.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for February, 1888; (4) the departures of the current month from the average; (5) and the extreme monthly precipitation for February during the period of observations and the year of occurrence:

State and station.	County.	(1) Average for the month of Feb.	(2) Length of record.	(3) Total for Feb., 1888.	(4) Departure from average.	(5) Extreme monthly precipitation for February.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Lead Hill	Boone	6.04	6	1.81	—4.23	10.93	1884	1.47	1885
California.									
Sacramento	Sacramento	3.07	22	0.55	—2.52	7.12	1878	0.35	1886
Salinas	Monterey	2.24	16	0.53	—1.71	8.77	1878	0.00	1874
Florida.									
Merritt's Island	Brevard	2.77	11	6.01	+3.24	6.01	1888	0.15	1882
Illinois.									
Greenville	Bond	3.97	5	2.75	—1.22	.....	.....	.....	.....
Peoria	Peoria	2.10	32	1.66	—0.44	.....	.....	.....	.....
Prairieville	Lee	3.22	8	1.40	—1.82	.....	.....	.....	.....
Riley	McHenry	1.79	25	1.17	—0.62	.....	.....	.....	.....
Sycamore	DeKalb	2.58	7	1.16	—1.42	.....	.....	.....	.....
Sandwich	DeKalb	2.88	38	2.59	—0.29	.....	.....	.....	.....
Indiana.									
Logansport	Cass	2.75	34	2.65	—0.10	7.40	1881	0.15	1868
Spiceland	Henry	2.88	28	1.40	—1.48	8.10	1883	0.90	1872
Sunman	Ripley	4.72	5	2.28	—2.44	7.48	1884	2.28	1888
Vevay	Switzerland	3.65	21	1.64	—2.01	10.23	1884	0.40	1877
Iowa.									
Creseo	Howard	0.95	15	1.02	+0.07	.....	.....	.....	.....
Monticello	Jones	1.92	34	1.48	—0.44	4.62	1887	0.32	1877
Kansas.									
Lawrence	Douglas	1.28	21	1.27	—0.01	4.60	1881	0.03	1870
Wellington	Sunman	1.12	10	1.12	0.00	3.73	1883	0.15	1879
Yates Centre	Woodson	1.93	8	1.49	—0.44	3.64	1881	0.55	1885
Louisiana.									
Point Pleasant	Tensas	6.92	7	4.19	—2.73	.....	.....	.....	.....
Grand Coteau	Saint Landry	3.01	6	7.44	+4.43	.....	.....	.....	.....
Mandeville	St. Tammany	6.13	4	9.02	+2.89	.....	.....	.....	.....
New Iberia	Iberia	3.10	4	6.01	+2.91	.....	.....	.....	.....
Maine.									
Gardiner	Kennebec	3.64	50	5.90	+2.26	9.47	1853	.....	.....
Maryland.									
Cumberland	Alleghany	2.45	16	2.15	—0.30	4.93	1882	0.60	1877
Massachusetts.									
Somerset	Bristol	3.63	18	2.87	—0.76	.....	.....	.....	.....
Newburyport	Essex	4.76	9	4.65	—0.11	6.75	1886	2.99	1880
Michigan.									
Thornville	Lapeer	2.25	12	0.83	—1.42	.....	.....	.....	.....
Kalamazoo	Kalamazoo	2.77	13	1.50	—1.27	.....	.....	.....	.....
Adrian	Lenawee	3.49	10	2.20	—1.29	.....	.....	.....	.....
New Hampshire.									
Concord	Merrimac	3.22	17	3.69	+0.47	5.55	1876	0.40	1877
New Jersey.									
South Orange	Essex	3.77	18	4.12	+0.35	6.10	1881	1.10	1877
Moorestown	Burlington	3.45	25	2.11	—1.34	6.02	1885	0.53	1877
New York.									
Palermo	Oswego	2.81	35	1.91	—0.90	7.20	1866	0.10	1874
Humphrey	Cattaraugus	3.19	5	1.74	—1.45	7.30	1887	1.57	1885
Ohio.									
North Lewisburg	Champaign	2.89	17	1.70	—1.19	5.70	1879	0.35	1872
Tiffin	Seneca	2.65	4	1.95	—0.70	6.60	1887	1.03	1885
Wauseon	Fulton	3.08	14	1.96	—1.12	7.19	1887	0.12	1877

Deviations from average precipitation—Continued.

State and station.	County.	(1) Average for the month of Feb.	(2) Length of record.	(3) Total for Feb., 1888.	(4) Departure from average.	(5) Extreme monthly precipitation for February.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Oregon.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Albany	Linn	6.18	9	1.26	—4.92	13.08	1881	1.26	1888
Pennsylvania.									
Corry	Erie	3.72	3	2.03	—1.69	6.79	1887	2.34	1886
Dyberry	Wayne	2.86	19	3.07	+0.21	5.59	1884	0.60	1877
Grampian Hills	Clearfield	3.47	24	1.73	—1.74	.....	.....	.....	.....
Wellsborough	Tioga	5.34	11	4.54	—0.80	.....	.....	.....	.....
South Carolina.									
Stateburg	Sumter	2.49	7	4.08	+1.59	4.08	1888	1.18	1883
Tennessee.									
Milan	Gibson	4.93	6	1.90	—3.03	7.96	1884	1.90	1888
Texas.									
New Ulm	Austin	4.54	16	4.66	+0.12	10.94	1882	1.06	1885
Corsicana	Navarro	2.84	3	4.91	+2.07	4.91	1888	1.11	1887
Vermont.									
Strafford	Orange	3.00	13	2.00	—1.00	5.9	1887	0.30	1877
Virginia.									
Bird's Nest	Northampton	3.66	19	2.55	—1.11	6.55	1884	1.60	1878
Dale Enterprise	Rockingham	3.45	8	2.63	—0.82	9.00	1884	0.83	1882
Variety Mills	Nelson	3.64	9	3.50	—0.14	7.12	1884	1.75	1879
Wytheville	Wythe	3.30	24	2.60	—0.70	8.00	1862	0.30	1877
West Virginia.									
Helvetia	Randolph	5.06	12	2.79	—2.27	8.18	1883	0.94	1877
Parkersburg	Wood	4.57	2	1.72	—2.85	7.42	1887	1.72	1888

SLEET.

During the month sleet was of common occurrence in the eastern and southeastern states, being more frequent in the first and middle decades than during the latter part of the month.

SNOW.

Only the dates of snow in Southern States are given, which are as follows:

Alabama.—Auburn, 14th; New Market, 26th, 27th; Montgomery, 27th.

Georgia.—Forsyth, 26th; Marietta, 27th; Atlanta, 26th and 27th.

Mississippi.—Lamar, 9th, 27th, and on latter date at Palo Alto, Tupelo, Batesville, Starkville, and University.

South Carolina.—Black's, Cedar Springs, and Clinton, 27th.

MONTHLY SNOWFALLS (in inches and tenths).

There was no appreciable amount of snowfall during the month to the south of the thirty-fifth parallel, except in the Rocky Mountain regions, and it appears that less than the usual quantity fell in the northern portions of the country. From Kansas and Nebraska eastward over Iowa, Missouri, and Illinois, the snowfalls generally ranged from 2 to 6; in Indiana, Ohio, and Kentucky, from 1 to 4. In Colorado, Dakota, Minnesota, the Lake region, New England, and portions of New York, Pennsylvania, and Maryland, the monthly fall was greater than in the states above-mentioned, but comparatively few stations report depths exceeding 10 inches. In the mountain regions of New England, monthly snowfalls of from 20 to 30 inches occurred, while along the southern coast comparatively little fell.

The following monthly snowfalls of ten inches or more occurred; but in states having less, the maximum amount is also given:

Arizona: Prescott, 2.. *Arkansas:* Eureka Springs, 0.6. *California:* Cisco, 7. *Colorado:* Aspen, 25; Pandora, 23; Trinidad, 11. *Connecticut:* New Hartford, 11.2. *Dakota:* Richardton, 18.8; Rapid City, 16.2. *District of Columbia:* Washington City, 7.2. *Georgia:* Marietta, 0.3. *Idaho:* Boisé City, trace. *Illinois:* Woodstock, 9.5. *Indiana:* Jeffersonville, 6.6. *Iowa:* Humboldt, 8. *Kansas:* Leavenworth, 3. *Kentucky:* Louisville, 5. *Maine:* Lewiston, 24.8; Cornish, 23.5; Orono, 20.5; Eastport, 14.4; Portland, 13.8; Gardiner, 13.2; Belfast, 13; Skowhegan, 12.4; Bar Harbor, 12.2. *Maryland:* New Midway, 9. *Massachusetts:* Groton, 17; Deerfield, 16; Concord, 14.2; Dudley, 14; Westborough, 12.5; Worcester, 12.3; Lawrence, 12.2; Blue Hill Observatory, Gilbertville, and Springfield, 12; Newburyport, 11.5; Ludlow, 10.6. *Michigan:*

Sault Sainte Marie, 56.5; Central Mine, 23; Bear Lake, 21.2; Calumet, 20.5; Benzonia, 18.5; Hillman, 16; Traverse City, 15.5; Escanaba, 14.8; Alpena, 13.7; Lathrop, 13.6; Buchanan, 12; Marquette, 11.9; Hartford, Maple Hill, and Hart, 11; Mackinaw City, 10.6; Harrisville and North Marshall, 10. *Minnesota:* Saint Vincent, 22; Northfield, 10. *Mississippi:* Palo Alto, 1. *Missouri:* Pierce City, 4.5. *Montana:* Fort Maginnis, 36.5; Fort Assinaboine, 19.2. *Nebraska:* Hay Springs, 13.5. *Nevada:* Toano, 4. *New Hampshire:* North Conway, 31.5; Reymouth, 22.5; Shelburne, 18; Concord, 17; Berlin Mills, 16.5; Manchester, 15.5; Nashua, 12.8; Hanover and Antrim, 11. *New Jersey:* Atlantic City, 4.8. *New Mexico:* Fort Stanton, 10.5. *New York:* Utica, 19.8; Saratoga, 19; Palermo, 12.8; White Plains, 12; Oswego, 11.3. *North Carolina:* trace. *Ohio:* Cleveland, 5.2. *Oregon:* La Grande, 2.2. *Pennsylvania:* Bernice, 18; Allegheny College, 16.5; Dyberry, 14.7; Eagle's Mere, 14; Blooming Grove, 12; Girardville, 11.7; Scranton, 11.3; Drifton, 10.5. *Rhode Island:* Woonsocket, 5. *South Carolina:* Cedar Springs, trace. *Tennessee:* Cookville, 3.5. *Texas:* El Paso, 1.8. *Utah:* Salt Lake City, 8.2. *Vermont:* Strafford, 21; Woodstock, 20.5; Brattleborough, 20; Northfield, 18.6; Newport, 18; Manchester, 17.1; Burlington, 12. *Virginia:* Rappahannock, 11.3. *Washington Territory:* Spokane Falls, 3.1. *West Virginia:* Middlebrook, 22; Helvetia, 14.2. *Wisconsin:* Waucousta, 20.5; Green Bay, 17.8; Embarras, 14.5; Delavan, 11.6. *Wyoming:* Camp Sheridan, 20.2; Fort Washakie, 10.4.

DEPTH OF UNMELTED SNOW ON GROUND AT END OF MONTH.

[*Expressed in inches and tenths.*]

At the end of February there was practically no unmelted snow on the ground in districts to south of the fortieth parallel east of the Rocky Mountains. In portions of Minnesota, Wisconsin, Michigan, and in the mountains of New England, there were from twenty to fifty inches.

Arizona: Prescott, 7. *Arkansas:* Eureka Springs, 0.6; Lead Hill, 0.1. *Colorado:* Pike's Peak, 3; Denver, 1. *Connecticut:* New Hartford, 10; Middletown and New Haven, trace. *Dakota:* Richardton, 12; Webster, 7; Bismarck and Fort Totten, 6; Huron, 4; Rapid City, 1.8; Parkston and Fort Sully, trace. *District of Columbia:* Washington City, trace. *Illinois:* Belvidere, 3; Lake Forest, Woodstock, and Riley, 2; Cedarville, 1.3; Sycamore, 1; Aurora, Oswego, Prairieville, Ottawa, Hennepin and Oneida, trace. *Iowa:* Cresco, 1.8; Maquoketa, 4; Dubuque, 3.5; Muscatine, 3; Cedar Rapids, 0.8; West Bend, 0.6; Clinton, 1; Fort Madison, drifts. *Maine:* Cornish, 36; Lewiston, 30; Gardiner and Showhegan, 24; Portland, Belfast and Fairfield, 12; Bar Harbor, 6; Orono, 5; Eastport, 1.4. *Massachusetts:* Rowe, 36; Deerfield, 16; Groton, 12; Fitchburg *a*, 9; Amherst, 6; Westborough, 6 (in the woods); Fitchburg *b*, 4; Lowell and Newburyport, 3; Milton, 1; Gilbertville, drifts; Blue Hill Observatory, trace. *Michigan:* Calumet, 56; Central Mine, 55; Lothrop, 44; West Branch, 36; Marquette, 31; Maple Hill, 27; Mackinaw City, Snowflake and Benzonia, 20; Hart and Bear Lake, 19; Fletcher, 18; Mio, 16; Big Rapids, 14; Hillman, 13; Alpena, 10; Escanaba and May, 8; Greenville, 6; Grand Haven, 5.8; Alma, 4.5; Bad Axe, 4; Saint Louis, 3; Traverse City and North Marshall, 2; Williamston and Hastings, 1; Grand Rapids, Lansing, and Pulaski, 0.5. *Minnesota:* Minneapolis and Spring Valley, 24; Red Wing, 23; Rochester, 22; Princeton, 21; Glenwood and Morris, 20; Leech Lake Dam, 19; Pine River Dam, 18; Lake Winnibigoshish Dam, 16; Saint Cloud, 15.5; Duluth and Alexandria, 15; Northfield, 12; Saint Paul, 10; Mankato, 7; Rolling Green, 6; Moorhead, 4; Pokegama Falls Dam, 2.9; Saint Vincent, 2. *Missouri:* Pierce City, trace. *Montana:* Poplar River, 6.7; Fort Maginnis, Fort Custer, and Fort Assinaboine, 4; Helena, 2. *Nebraska:* Valentine and Hay Springs, 2; North Platte, 0.1; Marquette, trace. *New Hampshire:* Plymouth, 36; Hanover, 35; Walpole, 30; Concord, 18; Manchester *a*, 9; Manchester *b*, 8.5; Nashua, 6. *New York:* Utica, 21; Palermo, 20; Oswego, 10; Cooperstown, 5; Menands, 3; Humphrey and Albany, 2; Buffalo and Rochester, 1; Boyd's Corners and Ithaca, drifts. *Ohio:* Garrettsville, trace. *Pennsylvania:* Dyberry, 18; Wellsborough, 14.3; Blooming Grove, 12; Drifton, 6; Grampian Hills, 4; Erie, 0.6; Quakertown, drifts; Phillipsburg and State College, trace. *Tennessee:* Jonesborough, Watkins, and Milan, trace. *Utah:* Salt Lake City, 2.4. *Vermont:* Lunenburg, 37; Northfield and Chelsea, 34; Newport and Stafford, 30; Burlington, 20; Manchester, 15. *Virginia:* Wytheville, 0.2; Rappahannock, trace. *Wisconsin:* Embarras, 56; Manitowoc, 36; Waucousta, 15.5; Green Bay, 14; Fond du Lac, 12; Madison, 10; La Crosse, 8; Milwaukee and Beloit, 2. *Wyoming:* Camp Sheridan, 16; Fort Washakie, 8; Fort Bridger, 1; Cheyenne, 0.1.

EXCESSIVE PRECIPITATION.

Table showing for the month of February monthly rainfalls of 10 inches, or more; rainfalls of 2.50 inches, or more, in any 24 consecutive hours; and rainfalls equaling or exceeding one inch in one hour.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time	Amt.
Alabama.		*Inches.*			*Inches*			*h. m.*	*Inches*
Carlowville			1874	5-6	2.80				
Marion						1874	17	1 00	1.00
Mobile			1872	5	3.45				
Do			1875	19	2.57				
Do			1880	1	2.78				
Do			1881	6	4.01				
Do			1887	20	4.22				
Montgomery			1873	14	2.87				
Do			1882	8	3.13				
Do			1884	17	2.55				
Arkansas.									
Fort Smith	1884	10.72	1883	23-24	2.53				
Do			1884	10-11	5.56				
Little Rock			1880	27	2.61	1882	27	1 00	2.00
Do			1880	28	2.63				
Do			1881	17-18	2.88				
Do			1882	7	2.79				
Do			1883	8	2.59				
Do			1882	27-28	3.89				
Do			1884	6	3.17				
Do			1887	13-14	2.50				
California.									
Los Angeles			1884	1-2	3.63	1884	17	1 00	1.00
Do			1884	16-17	2.70	1887	14	1 00	1.25
Do			1887	14-15	3.94				
San Francisco			1887	4-5	3.60				
Do			1887	5	2.92				
Santa Cruz	1878	16.11							
Connecticut.									
New Haven			1878	21-22	4.13				
Do			1886	11-12	2.99				
New London	1886	11.98	1881	18-19	2.55				
Do			1886	12	6.66				
Florida.									
Cedar Keys			1885	25	3.27				
Jacksonville			1874	14	2.66				
Do			1875	19-20	3.99				
Key West			1872	5-6	2.89	1872	5-6	1 30	2.00
Do			1878	26-27	2.94				
Newport			1874	2	3.20				
Pensacola			1881	7	2.65				
Georgia.									
Atlanta	1881	10.41	1881	8-9	3.33				
Do	1882	10.29	1881	11	2.92				
Do			1882	28	2.78				
Savannah			1874	13-14	3.02				
Illinois.									
Cairo	1882	10.14	1873	11-12	3.00				
Do			1874	20-21	2.83				
Do			1882	15-16	2.66				
Springfield			1882	20	3.38				
Do			1883	2-3	3.56				
Indiana.									
Indianapolis			1882	20	3.02				
Do			1883	3	2.50				
Iowa.									
Davenport			1883	15-16	2.91				
Keokuk			1883	16	3.66				
Kansas.									
Kinsley			1874	17-18	3.00				
Leavenworth						1869	12	2 00	2.00
Kentucky.									
Blandville			1874		2.75				
Louisville			1882	19-20	2.84				
Do			1884	5-6	3.30				
Louisiana.									
Baton Rouge	1875	11.60	1874	5	2.58				
New Orleans	1875	13.85	1875	19	5.71				
Shreveport			1882	2	3.12				
Maine.									
Portland			1885	10	2.95				
Do			1886	12-13	2.67				
Maryland.									
Baltimore			1886	11	2.60				

Table showing for the month of February, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
		Inches.			Inches			h. m.	Inches
Massachusetts.									
Boston			1886	12	4.45				
Michigan.									
Grand Haven						1883	16	1 00	1.00
Mississippi.									
Vicksburg			1887	19-20	2.53				
Missouri.									
Saint Louis			1857	5	2.91				
Do			1859	24	3.63				
Do			1882	19-20	4.44				
New Jersey.									
Lambertville			1854	26	3.40				
Do			1866	12	2.90				
New York.									
New York City			1885	9-10	2.62				
Do			1886	11-12	3.25				
Nichols			1874	24-25	11.70				
Oneida	1874	18.87	1874	13	10.10				
North Carolina.									
Ashville			1875	24	2.60				
Charlotte			1883	17-18	2.63	1884	19	1 00	1.00
Hatteras			1877	4-5	3.20	1877	5	1 00	1.00
Do			1880	2-3	3.54				
Murphy	1875	12.10							
Ohio.									
Carthagena			1874	21-22	2.50				
Cincinnati			1874	21	2.73				
Do			1884	5-6	2.50				
Do			1887	2-3	2.98				
Cleveland			1883	2-3	3.62				
Sandusky			1887	10-11	2.98				
Oregon.									
Astoria	1874	12.63							
Do	1885	10.59							
Do	1874	12.63	1884	18-19	2.85				
Eola	1878	10.22							
Do	1879	10.20							
Portland	1878	12.16	1879	11-12	2.80				
Do	1879	13.22	1882	27-28	2.78				
Do	1881	13.36							
Do	1882	10.49							
Pennsylvania.									
Erie			1883	3-4	3.35				
Rhode Island.									
Block Island			1886	11-12	3.50				
Do			1886	11-12	4.54				
Narragansett Pier	1885	11.20							
South Carolina.									
Charleston	1874	10.45	1884	16-17	2.79				
Tennessee.									
Chattanooga			1879	16-17	2.79				
Do			1884	6-7	3.19				
Knoxville	1873	12.52	1873	11-12	3.08	1873	11	0 50	1.00
Do	1875	10.18	1875	24	4.34	1873	12	0 45	1.20
Do			1879	16-17	2.50	1881	18	1 00	1.00
Do			1884	8-9	2.75				
Memphis			1873	15-16	3.17				
Do			1880	10-11	3.10				
Do			1880	12-13	3.05				
Nashville			1874	21-22	5.96				
Do			1874	21-22	5.26				
Do			1880	12-13	5.20				
Do			1881	18	2.59	1874	21	0 51	1.53
Do						1880	13	0 55	1.00
Texas.									
Belmont Farm			1878	6-7	3.00				
Clarksville	1874	12.25	1874	26-28	7.00				
Galveston			1872	27-28	3.69	1872	27	0 55	3.04
Do			1881	1	3.62	1888	22	1 00	3.31
Melissa			1877	11-13	7.31				
New Ulm			1875	14-15	2.75				
Palestine			1885	22-23	2.51				
Virginia.									
Capeville			1875	20	6.10				
Lynchburg			1875	24	2.56				
Norfolk			1872	8-9	3.45				
Do			1873	6-7	2.53				
Washington.									
Bainbridge Island	1878	10.22							
Canby, Fort	1885	11.20	1885	25-26	2.61				
Neah Bay	1885	18.50							
Do	1886	14.13							
Olympia	1878	14.20	1881	1	2.61				
Do	1879	15.59							
Do	1881	16.28							
Pysht	1885	12.37							
Tatoosh Island	1885	13.28	1886	6-7	2.74				
Do	1882	10.29	1886	5-6	2.73				
Do	1887	11.30	1887	27-28	3.11				
Do			1887	27-28	3.66				
Do			1887	27-28	3.30				

The records of the regular and voluntary Signal Service stations, covering periods ranging in general from twelve to seventeen years, show that during the month of February very few rainfalls in excess of one inch per hour have occurred since establishment of stations, and that they have been most frequent in the state of Tennessee. At Galveston, Tex., there have been two storms during which 3 inches or more have fallen in one hour or less; these are the most remarkable hourly rainfalls occurring in February that are shown by Signal Service records.

Rainfalls amounting to, or exceeding, two inches for a period of twenty-four hours or less, in the month of February, have not been of frequent occurrence in any part of the United States, and over extensive portions of the country no such rainfalls have ever been reported; the latter is true of the upper lake region, extreme northwest, Missouri and Rio Grande valleys, and Rocky Mountain districts. The portions of country that have been most frequently subjected to daily rainfalls of 2.50 inches, or more, are the Gulf States, Tennessee, and the central Mississippi valley; the records at Mobile, Ala., and Little Rock, Ark., showing the largest number of storms of this character. In the upper Ohio valley, lower lake region, and the states bordering on the Atlantic coast, the records of many stations show that no such rain storms have ever occurred, and that not more than two have been recorded at any one station.

Monthly rainfalls of ten inches, or more, in February in past years have been confined principally to the north Pacific coast, in which region they have been comparatively frequent; other sections of the country in which they have occurred are eastern Tennessee and the adjacent portions of North Carolina and Georgia, and southern Louisiana.

The geographical distribution of excessive monthly, daily, and hourly rainfalls for the months of January and February appears to be much the same, but on the north Pacific coast they are more frequent in January than in the succeeding month.

Excessive precipitation for the month of February, 1888.

States and stations.	Monthly, 6 inches, or more.	Specially heavy.					
		2 inches, or more, per day.			At rate of 1 inch, or more, per hour.		
		Am't.	Duration.	Date.	Am't.	Duration.	Date.
			h. m.			h. m.	
Alabama.							
Mobile	10.33	2.74	16 00	23			
Montgomery	7.67	2.62	10 49	23			
Union Springs	6.57	2.95	24 00	22			
Auburn	6.34	2.79	24 00	24			
Monroe		2.05	24 00	22			
Gadsden		2.00	24 00	24			
Talladega		2.12	24 00	7			
Bermuda		2.05		22			
Connecticut.							
New Hartford	7.07	2.25	*	20, 21			
Florida.							
Saint Francis Barracks	9.20	4.80		2			
Do		2.60	23 00	10, 11			
Tallahassee	8.10	4.30		20, 21			
Duke	7.35	4.00	21 00	2, 3			
Titusville	7.11	2.08	23 40	10, 11			
Pensacola	6.86	2.61	24 30	22, 23			
Manatee	6.82						
Merritt's Island	6.01						
Archer		2.40	14 00	21			
Cedar Keys		2.26	8 05	21			
Georgia.							
Quitman	7.75	3.60	25 30	20, 21			
Forsyth	7.37						
Milledgeville	6.34	2.35	24 00	23			
Illinois.							
Rockford		2.25	*	8			
Indian Territory.							
Tulsa	6.86?	4.80?		24			
Louisiana.							
Donaldsonville	11.63	5.10		22			
New Orleans	11.21	3.73	*	23, 24			
Mandeville	9.02	4.42		22, 23			
Luling	8.19	2.19		20			
Do		2.79		22, 23			
Morgan City	7.60	2.60		23			
Grand Coteau	7.44	5.32	52 00	22 to 24			
Lake Charles	6.25	4.50		22			
New Iberia	6.01						
Videlia		2.25		10			
Clinton		3.50		22, 23			
Baton Rouge		3.05		22			
Breaux Bridge		2.53		23			
Saint Martinsville		3.05		23			
Abbeville *a*		2.80		22			
Abbeville *b*		3.02		22			
Maine.							
Orono	6.11	2.26	*	20			
Portland		2.25	*	20, 21			
Minnesota.							
Minneapolis		2.38	*	11			
Mississippi.							
Biloxi	8.90	6.40	102 00	20 to 24			
Starkville	6.86						

Excessive precipitation, etc.—Continued.

States and stations.	Monthly, 6 inches, or more.	Specially heavy.					
		2 inches, or more, per day.			At rate of 1 inch, or more, per hour.		
		Am't.	Duration.	Date.	Am't.	Duration.	Date.
			h. m.			h. m.	
Missouri.							
Conception		2.00	*	3			
New Jersey.							
Tenafly	6.01	2.80		25			
New York.							
White Plains	10.43	3.90	24 00	20			
Garrison		2.02	24 00	21			
Utica		2.25		4, 5			
North Carolina.							
Salem	6.42						
Southport	6.25						
Wilmington	6.22	3.41	25 10	20, 21			
Pennsylvania.							
Easton	7.25						
Wellsborough		3.00	15 40	18, 19			
South Carolina.							
Abbeville	7.75						
Evergreen	7.50	2.14		25			
Newbury	6.43	2.00		24			
Balfast	6.25						
Cedar Springs	6.00	3.52		25			
Black's		2.00		25			
Texas.							
Galveston	7.54	3.75	12 58	22	3.31	1 00	22
Austin	4.27	32 30		14, 15			
Cedar Hills	3.50	24 15		22, 23			
Corpus Christi					1.30	1 00	4
Vermont.							
Manchester	2.10	19 00		20			
Washington Territory.							
Neah Bay	7.86						

*Less than 24 hours.

In the following table are given rainfalls of 2.50 inches or more per day, and of 1 inch or more per hour, as shown by records of self-registering rain-gauges at stations of the Philadelphia Water Department:

Station.	Length of record.	2.50 inches or more per day.			1.00 inch or more per hour.			
		Date.	Duration.	Amount.	Date.		Duration.	Amount.
			h. m.	*Inches*			h. m.	*Inches*
Frederick	1885-'7	Aug. 3, 1885	16 30	a5.04	Aug.	3, 1885	0 24	1.00
Doylestown	1884-'7	June 26, 1884	8 50	4.00	June	26, 1884	0 14	0.50
		Aug. 3, 1885	15 0	c5.89	Aug.	5, 1884	1 14	b2.03
		May 8, 1886	23 13	3.42	Aug.	3, 1885	0 20	1.50
		June 22-23, 1887	9 7	2.51	July	30, 1887	0 12	0.76
Philadelphia (Water Dep't.)	1885	Aug. 3, 1885	13 24	3.86	July	6, 1884	1 0	1.50
		May 8, 1886	27 30	3.36	July	7, 1885	0 29	0.90
		June 22-23, 1887	10 54	2.97	Aug.	3, 1885	1 25	2.80
		Sept. 11-12, 1887	10 5	2.66	Aug.	25, 1885	0 56	1.15
					May	8, 1886	0 11	0.16
					July	23, 1887	0 44	d1.86
					July	26, 1887	0 33	e1.16
Forks of Neshaminy.	1886-'7	May 8, 1886	18 18	2.46	July	29, 1887	0 42	1.16
		June 22-23, 1887	12 39	3.12				

a, of this amount, 3.27 inches fell in 4 hours and 8 minutes; rate per hour, 0.78. *b*, 1.30 of this amount in 20 minutes; rate per hour, 3.90. *c*, 4.40 of this amount in 1 hour and 43 minutes; rate per hour, 2.52. *d*, 0.92 of this amount in 13 minutes; rate per hour, 4.26. *e*, 0.62 of this amount in 7 minutes; rate per hour, 5.34.

For the above data the Chief Signal Officer is indebted to Chief Engineer John L. Ogden, Board of Public Works, Philadelphia, Pa.

The most remarkable of these rainfalls were those of August 3, 1885, on which date more than 5.00 inches fell at Frederick and Doylestown, more than 3.00 inches falling in about four hours at the former station, and nearly 4.50 inches in one hour and forty-three minutes at the latter station, while the amount given for thirteen hours in Philadelphia is nearly 4.00 inches. The storm of July 26, 1887, appears to have given the heaviest rate of fall per hour (5.34 inches); but this storm was of short duration, the actual amount of rainfall being 0.62 inch for seven minutes; it is, therefore, possible that this fall may have been equalled or exceeded in some of the other storms recorded, and it is probable that during the remarkably heavy fall at Doylestown on August 3, 1885, a rate of fall was attained which would have given a much larger amount than 2.52 inches per hour, the actual fall for that storm.

Rainfalls of four inches or more, and the heaviest rainfalls of each year, during a single storm, at Saint Louis, Mo., from 1838 to 1887, as shown by records of the late Dr. G. Engelmann (from 1838-'77) and of the signal office (1878-'87).

Year.	Month.	Date.	Duration.	Am't.	Year.	Month.	Date.	Duration.	Am't.
			h. m.	*Inch.*				h. m.	*Inch.*
1838	January	6-7	14 00	2.07	1861	March	31	10 00	2.34
1839	June	7-8	30 00	2.81	1862	December	13-14	30 00	4.47
1840	October	18	21 00	3.73	1863	August	9-10	25 00	3.86
1841	August	22	5 00	4.78	1864	May	10	10 00	2.34
1842	June	30	16 00	1.96	1865	March	29-30	40 00	4.90
1843	June	9	2 00	2.30	1866	August	31	3 00	3.23
1844	May	15-16	33 00	4.37	1867	May	27	18 00	4.42
1845	May	22	11 06	3.70	1868	August	30	11 00	3.99
1846	June	3-4	15 00	4.00	1869	November	16	18 00	3.15
1847	October	20-22	49 00	6.59	1870	August	2	4 00	2.50
1848	May	6	3 00	5.22	1871	January	13-14	42 00	3.00
	June	2	5 00	6.17	1872	June	27	4 00	*3.49
	June	21-22	29 00	7.55	1873	June	9-10	27 00	3.90
	August	15	1 00	5.05	1874	May	2-4	28 00	2.58
1849	July	5-6	30 00	3.88	1875	June	17	3 00	3.10
1850	November	26-27	26 00	4.38	1876	June	29-30	16 00	2.43
1851	August	2-3	21 00	3.95	1879	June	1	13 00	1.64
1852	March	11-13	53 00	5.54	1878	August	9-10	11 00	3.23
1853	May	2-3	35 00	2.88	1879	April	14	5 00	2.00
1854	April	26-27	22 00	4.34	1880	May	8-9	8 00	1.32
1855	August	15	8 00	4.19	1881	November	17-18	26 40	2.99
1856	April	30	5 00	3.80	1882	February	19-20	24 00	4.44
1857	February	6	9 00	2.91	1883	August	15	1 35	1.85
1858	July	11	10 00	4.18	1884	October	4	1 25	1.34
	December	4	15 00	5.00	1885	June	19-20	14 05	3.12
1859	June	18-20	30 00	7.83	1886	September	4	4 20	2.62
1860	June	2-3	12 00	3.73	1887	November	26	7 35	2.32

*Gauge filled and ran over.

NOTE.—The duration of the rain, as given above, covers some time when the rain is very light.

The record at Saint Louis shows that during the last forty-seven years storms giving rainfalls of four inches or more occurred nineteen times, and that these nineteen storms occurred in thirteen years, leaving thirty-four years of the period free from such storms. The duration of the storms giving four or more inches of rainfall ranges from one and one-quarter to fifty-three hours, the average being about twenty-one hours. The total duration of all storms (for which the precipitation was four or more inches) was four hundred and sixteen hours, and the aggregate rainfall 91.42 inches, the average per hour being 0.23 inch. By months, these storms occurred as follows: 1 in February; 2 in March; 1 in April; 3 in May; 4 in June; 1 in July; 3 in August; 1 in October; 1 in November; 2 in December; none occurred in January or September, and about forty per cent. of the entire number occurred in May and June. The year 1848, with respect to these storms, was the most remarkable one of the whole series, there having been four in that year; the same year also shows the maximum rate of fall, viz., 5.05 inches in one hour and fifteen minutes on August 15th.

WINDS.

The most frequent directions of the wind during February, 1888, are shown on chart ii, by arrows flying with the wind. In most districts the prevailing winds of the month were variable, as will be seen from the chart; they were, however, generally from southwest, west, or northwest in the Lake region, New England, and the middle Atlantic states.

HIGH WINDS.

No maximum velocities of fifty or more miles per hour, other than those given in the table of miscellaneous meteorological data, have been reported.

LOCAL STORMS.

Chester, Nassau Co., Fla.: at 6.30 a. m. on the 7th a severe

hail storm, lasting five minutes, occurred here; no serious damage resulted.

The "Charlotte (N. C.) Chronicle" of the 11th states that a hail storm occurred during the evening of the 10th between Charlotte and Columbia, S. C., along the line of the Charlotte, Columbia, and Augusta Railroad.

The "New York Times" of the 25th contains a report from Evansville, Vanderburg, Co., Ind., which states that a tornado passed through Vanderburg and Gibson counties on the afternoon of the 24th, causing much damage to buildings, etc.

A special dispatch to the "Missouri Republican" (Saint Louis) from Piedmont, Wayne Co., Mo., on the 19th, states that a tornado occurred near that place at 2.30 p. m. on the date mentioned. The path of the tornado is reported to have been about two hundred yards wide; it destroyed several buildings on the farms through which it passed. The course of the storm was from southwest to northeast for a distance of eight miles.

Between 4.30 and 5 o'clock on the afternoon of the 19th a tornado destroyed a large part of the town of Mount Vernon, Ill. (population about 8,000). Eighteen persons are reported to have been killed, and about three times that number were more or less seriously injured. About one hundred buildings were destroyed, among which was the county court-house, a large and substantial structure of brick and stone. Concerning this storm the "Chicago Tribune" of the 22d states: "The starting point of the storm which devastated Mount Vernon seems to have been near the old town of Kaskaskia, Randolph Co., not far from the Chester Penitentiary. Heavy timber was mown down in this vicinity, and the house of John Bond was destroyed, and himself and wife injured. The force of the wind seems to have 'scattered' as it passed in a northeasterly direction, and, while it did some damage at Steeleville, Randolph Co., and left a trail across Perry County, the damage was confined to wrecked buildings, no loss of life having been reported. Passing between Duquoin and Pinckneyville the storm turned due northeast, concentrated its energies, and swept upon Mount Vernon with the result the dispatches have outlined. No great amount of damage was done beyond Mount Vernon."

Rockford, Ohio Co., Ky.: reports from Mason's Landing, on Green River, state that during the evening of the 19th a storm destroyed a number of buildings in that vicinity, entailing losses amounting to several thousand dollars.

Wilkesbarre, Pa.: a number of buildings were unroofed and trees blown down during a violent storm which occurred here on the morning of the 25th.

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

In the following table are shown the danger-points at the various stations, the highest and lowest depths for February 1888, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, February, 1888 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
Red River:						
Shreveport, La	29.9	19, 20	20.6	4	18.8	1.8
Arkansas River:						
Fort Smith, Ark	22.0	5	9.2	20–23	3.4	5.8
Little Rock, Ark	23.0	8	10.5	25	3.2	7.3
Missouri River:						
Omaha, Nebr*	18.0					
Leavenw'rth, Kans	20.0	20, 24	9.5†	28	7.4†	1.1
Mississippi River:						
Saint Paul, Minn*	14.5					
La Crosse, Wis*	24.0					
Dubuque, Iowa*	16.0					
Davenport, Iowa*	15.0					
Keokuk, Iowa*	14.0					
Saint Louis, Mo	32.0	26	15.4	18, 19	8.5	8.5
Cairo, Ill	40.0	28	28.9	3,4	17.8	11.1
Memphis, Tenn	34.0	29	23.0	6	13.8	9.2
Vicksburg, Miss	41.0	1	24.8	9	19.7	5.1
New Orleans, La	13.0	3, 24	8.9	12	7.3	1.6
Ohio River:						
Pittsburg, Pa	22.0	27	10.6	1	2.6	8.0
Cincinnati, Ohio	50.0	16	27.1	3	8.5	18.6
Louisville, Ky	25.0	15, 16, 17	10.7	3,4	5.8	4.9
Cumberland River:						
Nashville, Tenn	40.0	15	18.1	3,4	8.6	9.5
Tennessee River:						
Knoxville, Tenn		11, 12	5.0	3	2.4	2.6
Chattanooga, Tenn	33.0	13, 26	11.2	3	5.2	6.0
Monongahela River:						
Pittsburg, Pa	29.0	27	10.6	1	2.6	8.0
Savannah River:						
Augusta, Ga	32.0	26	29.0	3	8.1	20.9
Sacramento River:						
Red Bluff, Cal		1	14.5	28, 29	2.4	12.1
Sacramento, Cal		16	20.0	1	15.2	4.8
Willamette River:						
Portland, Oregon		1	16.6	24, 25	3.5	13.1

*River frozen entire month. †Record for last 10 days only.

ICE IN RIVERS AND HARBORS.

Passamaquoddy Bay.—Eastport, Me.: floating ice in bay on the 19th.

Penobscot Bay.—The "Portland (Me.) Press" of the 15th contained the following:

ROCKLAND, *February* 14.—The ice which has closed up the harbors in this section since February 1st, started to-day. In the harbor, its departure was the cause of much excitement. It started here about noon, going out with the wind. The immense field of ice occupying the space from Owl's Head to Tillson's wharf, twelve to eighteen inches thick, started in a sheet and swung out in a body, taking all the fleet of vessels in winter quarters here that lay in its wake.

Portland Harbor.—Portland, Me.: the harbor was completely covered with ice from the 1st to 5th and 10th, and partially covered with ice on the 6th, 8th, 9th, 12th to 15th; floating ice in harbor on the 11th, 15th to 18th; ice disappeared rapidly on the 20th.

Boston Harbor.—Boston, Mass.: harbor froze over on 1st; ice broke up on 3d.

Wood's Holl Harbor.—Wood's Holl, Mass.: ice in harbor disappeared on the 14th.

Edgartown Harbor.—Edgartown, Mass.: navigation was suspended from 1st to 4th, and resumed on 5th; drift ice in harbor on the 11th.

Nantucket Harbor.—Nantucket, Mass.: ice was broken up by steamers and harbor cleared on 5th.

New London Harbor.—New London, Conn., 1st: many vessels which have come into harbor during the past two weeks are remaining on account of the harbors at other places being closed by ice. Floating ice in harbor on the 7th.

New Haven Bay.—New Haven, Conn.: the ice began to move out of harbor on the 14th.

East River.—New York City: floating ice on 29th.

Delaware River.—Port Jervis, N. Y.: the river was gorged for a distance of four miles on the 23d; the back-water flooded cellars and basements.

Bordentown, N. J.: large quantities of drift ice passed down the river on the 25th.

Philadelphia, Pa.: floating ice on the 2d.

Susquehanna River.—Port Deposit, Md.: the ice dam in the river at Garrett Island broke during the morning of the 25th.

Chesapeake Bay.—Baltimore, Md.: large quantities of floating ice were encountered on the 13th in the upper bay, causing considerable inconvenience to vessels.

Alleghany and Monongahela rivers.—Pittsburg, Pa.: floating ice in both rivers, 5th to 10th, 15th, and in Alleghany River 11th, 12th, 21st to 23d, 25th, 27th to 29th.

Genesee River.—Rochester, N. Y.: ice moved out of portions of river on the 23d.

Lake Erie.—Buffalo, N. Y.: the high winds of the 20th, 21st, and 25th broke up the ice in the lake.

Presque Isle Bay.—Erie, Pa.: the ice in the bay was twenty inches thick on the 16th.

Cuyahoga River.—Cleveland, Ohio: ice moved out of the river on the 20th.

Saint Clair River.—Port Huron, Mich.: floating ice on 5th, 6th, and 26th.

Grand River.—Grand Haven, Mich.: the river froze over on the 7th.

Saint Joseph River.—Mottville, Mich.: the ice moved out of the river on the 22d.

Lake Michigan.—Grand Haven, Mich.: vessels were inclosed by ice off this harbor on the 9th and 10th; on 12th the lake was frozen for a distance of forty miles from the shore; heavy slush ice blockaded entrance to harbor on the 29th.

Milwaukee, Wis.: at the close of the month the lake was almost covered with ice, and the strong westerly gales had packed it in large quantities along the east shore. Fields of ice from ten to twelve feet thick, interfering greatly with navigation, were reported off Ludington, Mich. The five steamers which ply between Milwaukee, Grand Haven, and Ludington were for eight days unable to enter either harbor or to get within eight miles of the east shore.

Ohio River.—Louisville, Ky.: the river was almost clear of ice at noon of the 5th.

Mississippi River.—Cairo, Ill.: the steamers "Dakota" and "Norton" left for Saint Louis on the 3d, being the first departure since closing of navigation, and the "City of Saint Louis" the first boat to arrive on the 5th. There was floating ice from the 1st to 17th, on account of which navigation was suspended on the 10th.

Keokuk, Iowa: the ice moved slightly during the night of the 22d; the river was still frozen at end of month.

Des Moines River.—Keokuk, Iowa: ice broke up and moved out of river on the 21st.

Embarras River.—Charleston, Coles Co., Ill.: ice in river, three miles and a half east of this place, broke and moved down the stream on the 20th.

Missouri River.—Fort Buford, Dak.: the river at this place remained almost entirely frozen throughout the month, with slowly rising water.

Leavenworth, Kans.: the ice in the river broke up and moved out on the 19th, navigation having been closed since December 20, 1887. Floating ice on the 23d.

FLOODS.

Lawrence, Douglas Co., Kans.: a sudden rise occurred in the Kansas River at this place on the 20th, which resulted in the washing away of the machinery, valued at several thousand dollars, at the Bowersock's mill.

Norwich, Conn.: the heavy rain of the 20th caused a breaking up of the ice, after which the river rose rapidly and overflowed some of the lower streets.

New Haven, Conn.: the dam of the Fountain Water Company, at West Ansonia, New Haven County, gave way during the night of the 20th–21st, flooding the valley.

Palmer, Hampden Co., Mass.: a very destructive freshet occurred here during the night of the 20th–21st. The lowlands were flooded for miles to depths reaching ten feet. Numerous dwellings were flooded and many outbuildings and bridges were washed away.

Springfield, Mass.: at Chicopee, in this county (Hampden), on the 21st, the dam of the Dwight Company was carried away by the freshet resulting from the giving away of the ice dam in the Chicopee River.

Fremont, Sandusky Co., Ohio: the lowlands adjacent to the Sandusky River were flooded on the 21st.

Augusta, Me.: the heavy rains of the 21st–22d caused the flooding of basements and cellars of many houses in this city.

Galveston, Tex.: more than three inches of rain fell here in one hour (9.30 to 10.30 a. m.) on the 22d. The capacity of the sewers of the city was not sufficient to carry off the heavy fall of water and consequently the streets were flooded. This was the heaviest rainfall that has occurred since November 2, 1873, when 3.50 inches fell in thirty minutes.

Montgomery, Ala.: the heavy rainfall of the 23d caused the rivers in this vicinity to rise considerably. On the 26th the lowlands opposite this place were inundated.

New Orleans, La.: nearly four inches of rain fell during the storm of the 23d–24th, resulting in the flooding of a considerable area near the city.

Charlotte, N. C.: the heavy rainfall of the 24th caused the streams in this section to overflow. The streets in Charlotte were inundated in some places.

Fort Maginnis, Mont.: the Missouri River at Rocky Point and Gulpin, about sixty miles from this place, rose ten and a half feet on the 24th, and small creeks overflowed.

Augusta, Ga.: the unusually rapid rise in the Savannah River, which occurred from the 24th to the 26th, culminated in an overflow of the river plantations on the last mentioned date. The telegraphic flood warnings, however, which were sent out by the Chief Signal Officer, on the 21st, enabled the planters to remove their farming implements and stock to safe places.

Bordentown, Burlington Co., N. J., 25th: during the past few days the Delaware River has swollen so as to overflow the lowlands on the Pennsylvania side.

HIGH TIDES.

Eastport, Me., 14th and 28th; Southport, N. C., 10th; Fort Canby, Wash., 12th.

Onancock, Accomac Co., Va.: during the high southeast winds on the 27th the tide in Onancock Creek rose seven feet above high-water mark, a height within a few inches of that of the very high water of 1877. The tide came up suddenly and soon subsided.

ATMOSPHERIC ELECTRICITY.

AURORAS.

The most notable auroral display of the month was that of the 8th, which was observed from eastern Montana to the New England coast, and as far southward as the forty-second parallel. Although this display was extensively observed, it does not appear to have been especially brilliant and, so far as reports at hand show, it had no appreciable influence upon the telegraph lines, etc., as is commonly noted during an extended display. Concerning this display, the following notes from the daily journals of observers are given:

Bismarck, Dak., 8th: an auroral arch extended over 75° of the northern horizon and to an altitude of 40° from 10 p. m. until midnight; color, pale yellow.

Fort Totten, Dak., 8th: faint aurora from 8.30 p. m. until midnight, after which time the display became brilliant and lasted until 5.30 a. m. of 9th.

Saint Vincent, Minn., 8th: an aurora appeared at 9 p. m. and continued until 7 a. m. of the 9th; the display consisted of a segment of white light; altitude 12°; azimuth 135°.

Saint Paul, Minn., 8th: auroral light from 11.25 p. m., extending from 165° to 210° azimuth and to 25° altitude at centre, with two streamers reaching upward 43°; these streamers were most of the time pale, but they occasionally attained considerable brilliancy.

Green Bay, Wis., 8th: a faint aurora appeared during the night; it was first seen at 10.10 p. m. in the form of an arch, altitude about 20°, azimuth from 95° to 265°; at 11 p. m. the display was the same as when first seen.

Mackinaw City, Mich., 8th: aurora was observed at 8.40 p. m., as a luminous band, through which the stars were seen; the arch reached an altitude of 25° and covered one hundred and five degrees of the horizon; beneath the arch was a dark segment of 10° altitude.

Erie, Pa., 8th: a faint aurora was observed at 10 p. m.; azimuth 20°, altitude 10°.

Lyons, N. Y., 8th: a diffuse aurora was observed throughout the evening of the 8th.

Manchester, N. H., 8th: an aurora was observed from 9.15 p. m. until 10.40 p. m, consisting of a broad, low arch of bright straw color, extending from about 140° to 220° azimuth, with a dark segment beneath; there were no streamers or flashes, but a steady bright light which reached its greatest brilliancy at 9.45 p. m.

Auroras were observed during the month as follows: 1st, Webster, Dak. 3d, San Diego, Cal.; Northfield, Conn.; Gardiner and Orono, Me. 4th, Fort Buford and Webster, Dak.; Moorhead, Minn.; Fort Assinaboine and Poplar River, Mont. 5th, Cresco, Iowa, and Helena, Mont. 8th, Voluntown, Conn.; Garden City, Parkston, Webster, Bismarck, Fort Totten, and Fort Sully, Dak.; Bancroft, Independence, Monticello, and Wesley, Iowa; Cornish, Me.; Cambridge, Blue Hill Observatory, Milton, Provincetown, and Westborough, Mass.; Mackinaw City, Mich.; Moorhead, Saint Paul, and Saint Vincent, Minn.; Poplar River, Mont.; Berlin Mills, Manchester, and Nashua, N. H.; Garrison, Ithaca and Lyons, N. Y.; Lordstown, Ohio; Erie, Pa.; Green Bay, Wis. 9th, Poplar River, Mont. 10th, Saint Vincent, Minn.; Helena, Mont. 11th, Frankfort, Ky. 14th, Wesley, Iowa. 15th, Saint Vincent, Minn. 17th, Webster, Dak.; Wesley, Iowa; Eastport, Me.; Moorhead and Saint Vincent, Minn. 18th, Fort Buford, Dak.; Eastport, Me.; Poplar River, Mont.; Berlin Mills, N. H. 19th, Webster, Dak., and Poplar River, Mont. 23d, Fort Buford and Fort Totten, Dak.

THUNDER-STORMS.

Thunder-storms were reported as follows: 1st, Willcox, Ariz. 2d, Titusville, Fla., and Tribune, Kans. 3d, Archer, Cedar Keys, Limona, Merritt's Island, and Titusville, Fla.; Quitman, Ga.; Biloxi and Palo Alto, Miss.; Brownsville and Corpus Christi, Tex. 4th, Jupiter, Fla.; Abilene, Corpus Christi, Galveston, New Ulm, and San Antonio, Tex. 5th, Fall Brook, Cal.; Alva, Cedar Keys, Jupiter, Limona, Merritt's Island, Tallahassee and Titusville, Fla.; Quitman, Ga. 6th, Alva, Cedar Keys, Jupiter, Merritt's Island, and Titusville, Fla. 7th, Little Rock, Ark.; Alva, Jupiter, Merritt's Island, and Titusville, Fla.; Liberty Hill, and Shreveport, La.; Fort Sill, Ind. T.; Cedar Hill and Palestine, Tex. 8th, Livingston, Mobile, and Mount Vernon, Ala.; Jacksonville, Key West, Titusville, Jupiter, Pensacola, Duke, Limona, and Merritt's Island, Fla.; Quitman, Ga.; New Orleans, La.; Palo Alto, Miss.; Galveston and Palestine, Tex. 9th, Auburn and New Market, Ala.; Cedar Keys, Key West, Merritt's Island, and Titusville, Fla.; Forsyth, Ga. 10th, Auburn, Mobile, and Montgomery, Ala.; Cedar Keys, Duke, Jacksonville, Merritt's Island, Tallahassee, and Titusville, Fla.; Forsyth, Marietta, and Quitman, Ga.; Palo Alto, Miss.; Columbia, S. C.; San Antonio, Tex. 11th, Cedar Keys, Duke, Jacksonville, Limona, Merritt's Island, Tallahassee, and Titusville, Fla.; Quitman and Savannah, Ga.; Chicamicomico, Raleigh, Southport, and Weldon, N. C.; Charleston, S. C.; Cape Henry and Norfolk, Va. 12th, Cedar Keys, Jacksonville, Key West, Limona, and Titusville, Fla.; Quitman and Savannah, Ga.; Fort Sherman, Idaho. 13th, Montrose, Colo.; Webster, Dak.; Leon de Aldamas, Mexico. 14th, Fort Verde, Ariz.; San Antonio, Tex. 15th, Fort Verde, Fort Mojave, Tucson, Whipple Barracks, and Yuma, Ariz.; Brownsville, Tex. 16th, Fort Mojave, Whipple Barracks, and Yuma, Ariz.; Keeler, Cal. 17th, Willcox, Ariz.; Concordia, Kans.; Fort Stanton and Lava, N. Mex. 18th, Lebo, Manhattan, and Tribune, Kans.; Fort Reno and Fort Supply, Ind. T.; Conception, Mo. 19th, New Market, Ala.; Lead Hill and Little Rock, Ark.; Cairo, Collinsville, and Palestine, Ill.; Butlerville, Dana, Indianapolis, Jeffersonville, Laconia, Logansport, Salem, Sunman, and Vevay, Ind.; Fort Madison, Iowa; Frankfort and Louisville, Ky.; Liberty Hill, La.; Palo Alto, University, and Vicksburg, Miss.; Frankford, Saint Louis, and Springfield, Mo.; Cincinnati, Cleveland, College Hill, Jacksonborough, and Wauseon, Ohio; Ashwood, Austin, Milan, Memphis, and Nashville, Tenn.; Palestine, Tex. 20th, New Hartford, Conn.; Augusta, Ga.; New Orleans, La.; Newburyport, Mass.; Biloxi, Miss.; Readington, N. J.; Setauket, N. Y.; Columbia and Stateburg, S. C.; Nashville, Tenn.; Galveston, Tex.; Middlebrook, Va. 21st, Fort Thomas, Ariz.; Cedar Keys and Sebastian, Fla.; Quitman, Ga. 22d, Pensacola, Fla.; New Orleans, La.; Biloxi, Miss.; Corpus Christi, Galveston, New Ulm, and San Antonio, Tex. 23d, Auburn, Mobile, and Montgomery, Ala.; Hot Springs and Little Rock, Ark.; Pensacola, Fla.; Quitman, Ga.; New Orleans and Liberty Hill, La.; Biloxi, Miss.; Cedar Springs, S. C.; Cedar Hill and Galveston, Tex. 24th, Mobile, Montgomery, and New Market, Ala.; Lead Hill, Ark.; Pensacola, Fla.; Quitman, Ga.; Cairo and Palestine, Ill.; Indianapolis, Jeffersonville, Salem, Sunman, Terre Haute, and Vevay, Ind.; Lexington and Louisville, Ky.; Biloxi, Miss.; Cincinnati, College Hill, Jacksonborough, and Yellow Springs, Ohio; Cedar Springs and Columbia, S. C.; Ashwood, Milan, Chattanooga, Knoxville, and Nashville, Tenn. 25th, Wilmington, N. C.; New Ulm, Tex. 26th, Limona, Fla. 27th, Sacramento and Willows, Cal. 29th, Fort Bowie, Fort McDowell, and Yuma, Ariz.; Fort Lewis, Colo.; Sandwich and Sycamore, Ill.; Fort Supply, Ind. T.; Fort Stanton and Lava, N. Mex.; Oswego, N. Y.; La Crosse, Wis.

MISCELLANEOUS PHENOMENA.

FOREST AND PRAIRIE FIRES.

Keeler, Cal., 12th; Fort Sill, Ind. T., 20th to 22d; Fort Reno, Ind. T., 21st; Duke, Fla,, 23d.

METEORS.

Pensacola, Fla., a large meteor was observed in altitude 40°, moving from southeast to northwest, at 8.30 p. m. on the 15th. As the meteor fell it increased in brilliancy and exploded when in about altitude 10°; in the flight it left a brilliant trail.

Meteors were also observed as follows: 1st, Lead Hill, Ark., and Keeler, Cal. 2d, Yuma, Ariz.; Rappahannock, Va. 3d, Middlebrook, W. Va. 4th, Biloxi, Miss., and East Portland, Oregon. 5th, Parkston, Dak.; Clear Lake, Iowa. 7th, Wilmington, N. C. 8th, Auburn, Ala.; Lead Hill, Ark.; Clear Lake, Iowa. 11th, Jacksonville, Ill. 13th, Voluntown, Conn.; Wilson and Elkin, Kans. 14th, Readington, N. J. 15th, Pensacola, Fla.; Vevay, Ind.; Clear Lake, Iowa; Tribune, Kans.; La Crosse, Wis. 16th, Lead Hill, Ark.; Wauseon, Ohio. 17th, Wauseon, Ohio. 18th, Yuma, Ariz. 21st, Jacksonville, Ill.; Clinton, Clear Lake, and Keokuk, Iowa. 22d, Independence, Iowa; Rappahannock, Va. 23d, Taunton, Mass. 25th, Rappahannock, Va. 27th, Jacksonville, Ill. 28th, Kalamazoo, Mich.

MIGRATION OF BIRDS.

Geese flying northward.—Fort Bidwell, Cal., 3d, 7th, 24th, 26th; Charlotte, N. C., 3d, 26th; Chattanooga, Tenn., 3d, 26th; Wakefield, Kans., 10th, 29th; Augusta, Ga., 12th; Linkville, Oregon, 15th; Fort Madison, Iowa, 17th; Yankton, Dak., 18th; Crete, Nebr., and Auburn, Ala., 19th; Ames, Iowa, 19th to 24th; Charleston, Ill., 20th; Fort Reno, Ind. T.; Manson, Keokuk, and Osceola, Iowa, 21st; Manhattan and Topeka, Kans., and Portland, Me., 22d; Mesquite, Tex., 24th; Winnemucca, Nev., 26th; Rappahannock, Va., 26th to 28th; Salina, Kans., and Liberty Hill, La., 28th.

Geese flying southward.—Rappahannock, Va., 10th, 19th; University of Virginia, 20th.

Ducks flying northward.—Charleston, Ill., 20th; Crete, Nebr., 22d; Wakefield, Kans., 22d, 29th; Salina, Kans., 28th.

Ducks flying southward.—Duke, Fla., 23d.

Ducks flying eastward.—Little Rock, Ark., 26th; Fort Verde, Ariz., 29th.

Swans flying northward.—Fort Bidwell, Cal., 21st.

MIRAGE.

Mirages were observed as follows: 1st, Parkston and Richardton, Dak. 6th, Corpus Christi, Tex. 7th, Yuma, Ariz.;

Corpus Christi, Tex. 11th, Tribune, Kans. 12th, Salina, Kans. 13th, Salina and Tribune, Kans. 14th, Helena, Mont. 17th, Tribune, Kans.; Marquette, Nebr. 18th, Webster, Dak.; Marquette, Nebr. 20th, Salina, Kans.; Fairbury, Nebr. 23d, Marquette, Nebr. 27th, Webster, Dak.

SAND STORMS.

Fort Grant, Ariz., 15th; Willcox, Ariz., 17th, 28th, 29th.
Fresno, Cal., 18th.
Fort Mojave, Ariz., 18th, 27th; Yuma, Ariz., 19th, 20th.
Las Vegas, N. Mex., 29th.

VERIFICATIONS.

INDICATIONS FOR 33 HOURS IN ADVANCE.

The percentages of verifications of the tri-daily indications for February, 1888, as determined from comparison of succeeding telegraphic reports, are given in the table below.

The predictions for all districts east of the Rocky Mountains for February, 1888, were made by 1st Lieutenant H. H. C. Dunwoody, 4th Artilley, U. S. Army, Acting Signal Officer and Assistant, except those for Minnesota and Dakota, which were made at Saint Paul, Minn., by 1st Lieutenant Thomas M. Woodruff, 5th Infantry, U. S. Army, Acting Signal Officer; those for the Pacific coast districts were made at San Francisco, Cal., by 2d Lieutenant J. E. Maxfield, Signal Corps; the verifications for all districts were determined by Junior Professor C. F. Marvin.

Percentages of indications verified, February, 1888.

States.		States.	
Maine	83.38	Kentucky	80.69
New Hampshire	84.00	Ohio	80.83
Vermont	77.66	West Virginia	80.66
Massachusetts	83.56	Indiana	82.66
Rhode Island	81.45	Illinois	80.34
Connecticut	86.24	Lower Michigan	80.69
Eastern New York	81.31	Upper Michigan	77.28
Western New York	79.72	Wisconsin	83.10
Eastern Pennsylvania	81.69	Minnesota*	73.97
Western Pennsylvania	82.17	Iowa	79.59
New Jersey	80.79	Kansas	84.69
Delaware	79.48	Nebraska	78.76
Maryland	82.93	Missouri	80.14
District of Columbia	82.10	Colorado	81.31
Virginia	78.21	Dakota*	70.93
North Carolina	81.03	Southern California*	82.03
South Carolina	79.59	Northern California*	81.48
Georgia	78.52	Oregon*	82.89
Eastern Florida	76.66	Washington Territory*	77.90
Western Florida	74.31	*By elements:*	
Alabama	75.10	Weather	83.58
Mississippi	79.13	Wind	77.48
Louisiana	78.86	Temperature	77.54
Texas	79.59		
Arkansas	78.83	General average	80.55
Tennessee	81.38		

*In determining the general average percentage for the different elements, Minnesota, Dakota, and the Pacific coast states have not been included.

CAUTIONARY SIGNALS.

Of the total number of cautionary and storm signals ordered during February, 1888, it was practicable to determine the justification or failure of twenty-eight; justified, twenty-five, or 89.29 per cent. Of the above, twelve were ordered for cautionary signals; number justified, ten, or 83.33 per cent. Sixteen storm signals were ordered; justified, fifteen, or 93.75 per cent. Total number of direction signals ordered, twenty-seven, all, or 100 per cent., of which were justified, five signals being ordered for easterly winds, and twenty-two for westerly winds. Number of storms without signals, thirteen. Number of signals ordered late, *i. e.*, after the justifying velocity had begun, eight, or 28.57 per cent.

COLD-WAVE SIGNALS.

Total number of cold-wave signals ordered from Office Chief Signal Officer, one hundred and eighty; justified, one hundred and fifty-five, or 86.11 per cent. One hundred and eighteen cold-wave signals were ordered during the month by the Signal Service Officer at Saint Paul, Minn., of which, ninety-eight, or 83.05 per cent., were justified.

LOCAL VERIFICATIONS.

The following extracts from the published reports of the several state weather services for February, 1888, show the percentages of verification of weather and temperature signals for the various states:

Indiana.—La Grange: the indications received during February were the best and most correct since they have been sent here; 100 per cent. for state of weather and 97 per cent. for temperature were verified.

Seymour: The indications are growing in favor with the people; 87 per cent. were verified.

Michigan.—Weather and temperature signals are now displayed in one hundred and forty-three towns in the state, and on the baggage-cars of twenty-six trains on eight principal railroads of the state.

The indications and cold-warnings are issued by the Chief Signal Officer and distributed to the different stations through the central office. The indications are issued at 1 a. m., daily, from the Chief Signal Office, Washington, and are for the twenty-four hours from 7 a. m. to 7 a. m.

The percentage of verification of these indications for February is as follows (the verification is taken from reports of displaymen furnished this office monthly): weather, 84.8 per cent.; temperature, 81.6 per cent.

The percentage of verification of weather predictions for February on the D., G. H., and M. R'y., is 87.0 for weather, and 81.3 for temperature; on the C. & G. T. R'y., weather, 86.7, and temperature, 83.0; P. H. & N. W. R'y., weather, 90.0, and temperature, 87.0; M. C. R'y, for weather, 83.3, and for temperature, 87.0; G. R. & I. R'y, weather, 83.3, and temperature, 85.0; C. & W. M. R'y, weather, 85.0, and temperature, 83.3; P. O. & P. A. R'y, weather, 90.0, and temperature, 87.0.

Minnesota.—The percentage of verification of weather signals was 80 for weather, and 76 for temperature.

Nebraska.—The percentages of correct predictions for the state are as follows: temperature, 86.2; weather, 83.3; mean, 84.8.

Nevada.—The display of signals at Carson City, which has been done regularly since October 4, 1887, has given great satisfaction to the citizens of that place and vicinity, and so generally have the indications been verified that there is reason to hope that they will be of great benefit to the interests of Nevada.

Oregon.—The weather indications displayed at Albany, Salem, and Roseburg, were verified as to weather 78 per cent., as to temperature 77 per cent. These indications are telegraphed at 2 p. m. daily from San Francisco, and are for the twenty-four hours commencing at 7 p. m. date of receipt of telegram.

South Carolina..—The percentages of verifications of the weather and temperature predictions for the whole state was: for weather, 86.3; for temperature, 90.1

Tennessee.—The percentage of verification of the daily weather and temperature predictions, issued from the Signal Office at Washington to the various stations were, for the state: weather, 88.9 per cent.; temperature, 88.8 per cent.

STATE WEATHER SERVICES.

The following extracts are republished from reports for February, 1888, of the directors of the various state weather services:

The "Alabama Weather Service," P. H. Mell, jr., of the Agricultural and Mechanical College, Auburn, director:

The month had no special features to distinguish it from Februarys of previous years. Only two cold waves passed over the state, and they were not severe. The average temperature was 2°.4 above the normal. In some portions of the state considerable rain fell, but yet the average was about normal.

The winter has been quite mild, and but few days occurred that were really cold and disagreeable. Rainy days, however, were frequent. The warm days towards the latter part of the winter brought forth the early buds on the fruit trees and in the forests, but many of the tender germs were destroyed by the cold wave that passed over the state on the 26th of February. There is, however, a good prospect for a fair yield of fruit, because many of the buds were not far enough advanced to be materially affected by the cold snap.

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 51.6; highest monthly mean, 66.1, at Newton; lowest monthly mean, 38.8, at Chattanooga; maxi-

mum, 79, at Newton, on 11th; minimum, 9, at Gadsden, on the 24th; range for state, 70; greatest local monthly range, 59, at Valley Head; least local monthly range, 43, at Union Springs.

Precipitation, including melted snow (in inches).—Average for the state, 4.94; greatest, 10.33, at Mobile; least, 2.90, at Carrolton.

The "Arkansas Weather Service;" report prepared by W. U. Simons, Signal Corps, Little Rock:

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 44.2; highest monthly mean, 47.2, at Washington; lowest monthly mean, 39.0, at Conway; maximum, 75, at Little Rock, on 19th; minimum, 7, at Eureka Springs, on the 27th; range for state, 68; greatest local monthly range, 63, at Eureka and Fort Smith; least monthly range, 46, at Washington.

Precipitation, including melted snow (in inches).—Average for the state, 2.38; greatest, 5.25, at Portia; least, 0.60, at Heba.

The "Colorado Weather Service," Prof. F. H. Loud, Colorado Springs, director:

Summary.

Temperature, (in degrees Fahr.).—Mean for state (nineteen stations reporting), 29.2; highest monthly mean, 41.2, at Canon City; lowest monthly mean, 15.8, at Climax; maximum, 70, at Greely, on 12th and 28th; minimum, —6, at Alma, on 5th; monthly range for state, 76; greatest local monthly range, 70, at Pandora; least local monthly range, 38, at Georgetown.

Precipitation, including melted snow (in inches.)—Average for state (ten stations reporting), 0.50; greatest, 1.29, at Walden; least, 0.15, at Husted.

The "Monthly Review of the Illinois Weather Service," Col. Charles F. Mills, Springfield, director:

The temperature was below the average in all divisions of the state, 3° below in the northern, 2°.4 in the central, 2°.8 in the southern, and in the whole state 2°.7 below the average of the past ten years. The lowest temperature, —28°, was only once exceeded during the last ten years, in 1885, when it reached —32°. Only twice during the same period has the mean temperature been lower, in 1881, when it was 24.5, and 1885, when it was only 18.7. The highest mean temperature in ten years was 39°.5, in 1882, and the lowest was 18°.7, 1885, showing the large range of 20°.8. The mean of the past February, 27°.1, was 8°.4 above the lowest, and 12°.4 below the highest. The coldest days were the 9th and 24th, and the warmest were the 18th and 19th.

The rainfall was also greatly below the average of the past ten years, 1.48 inches for the state, 1.32 for the northern, 1.11 for the central, and 2.02 for the southern division. The total mean for the month was 1.96 inches, more than the half of which fell on the 24th. The snowfall was light, only 3 inches for the average of the state.

The "Indiana Weather Service," Prof. H. A. Huston, of Purdue University, Lafayette, director:

The barometric pressure over Indiana during the month of February was near the normal. An exceedingly high area of pressure passed over the state on the 15th, when the readings of the barometer were the highest for many years. The centres of low areas passed distant from the state, except on the 19th and 24th, very low depressions passing near caused thunder-storms over all parts; most violent, accompanied by hail and dangerous winds, in southwest portion. Sudden fluctuations occurrred on the 4th, 7th, 9th, 15th, 19th, 21st, 24th, 27th, and 29th.

The monthly mean temperature was above normal in the east and southeast portions, and slightly below in the remainder of the state. The lowest readings were noted on the 9th in the central and northern portions of the state, when the temperature read below zero, and in the southern portion on the 27th the temperature remaining above. The highest readings were noted from the 18th to the 24th. Sudden changes occurred on the 6th, 9th, 25th, 26th, and 29th.

The precipitation was over two inches below the normal in all parts of the state, except in the northern portion, where the deficiency was slightly less. The amount of snowfall was slight only; several observers reported none at all.

Except in the extreme southern part of the state the observers report wheat and pasturage in a bad condition, caused by the deficiency of rainfall preceding the winter months, insufficient snowfall to protect the crops from continuous cold during the winter, and during February warmer rains followed suddenly by hard freezing weather.

The "Kansas Weather Service," Prof. J. T. Lovewell, Topeka, director:

Summary.

Atmospheric pressure (in inches).—Monthly mean, 30.08; maximum, 30.94, at Lebo, on the 15th; minimum, 29.43, at Wilson, on the 18th; range for state, 1.51; greatest local range, 1.40, at Lebo; least local range, 1.17, at Halstead.

Temperature (in degrees Fahr.).—Monthly mean, 37; highest monthly mean, 46, at Dorrance; lowest monthly mean, 31, at Cawker City and Leavenworth; maximum, 82, at Collyer, on the 20th; minimum, —8, at Concordia, on the 9th; range for state, 91; greatest local monthly range, 82, at Collyer, least local monthly range, 50, at Monument; greatest daily range, 50, at Gibson, on the 8th; least daily range, 2, on the 9th, at Rome and Sedan.

Precipitation, including melted snow (in inches).—Average for the state, 1.05; greatest, 2.30, at McAllister; least, 0, at Bunker Hill.

Wind.—Prevailing direction, south.

The "Louisiana State Weather Service," in charge of R. E. Kerkam, Sergeant, Signal Corps, at New Orleans:

The mean temperature of the past month for the state, 56°.0, was 1°.6 above the February normal of the past eighteen years, in which period there were but two Februarys (1882 and 1887) that were noticeably warmer. The coldest February during that period was in 1885, when the mean temperature was 7°.5 below that of the past month. The mean temperature of the northern division was 52°.9, and of the southern division, 58°.6. The highest temperature reported, 79°, occurred at Abbeville, on the 8th, and the lowest, 28°, at Delta, on the 28th, making the absolute range of temperature for the state 51°. The mean daily range of temperature was 14°.4, the highest local mean daily range, 16°.5, being reported from Shreveport, and the lowest, 11°.0, from Monroe. The mean maximum temperature for the state for the month was 63°.4, and the mean minimum, 48°.3.

The average rainfall for the northern division was 3.54 inches, which was a deficiency of one and three-fourths inches in comparison with the eighteen years' normal for that section. The average rainfall for the southern division, 6.88 inches, was an excess of 2.85 inches in comparison with the eighteen years' normal for that section, and the average for the state for the month, 5.54 inches, was 0.81 of an inch above the February normal for the state. The heaviest monthly rainfalls reported were 11.63 inches, at Donaldsonville, 11.21 inches, at New Orleans, and 9.02 inches, at Mandeville. The heaviest daily rainfalls in the southern division ranged from 2.80 at Abbeville to 5.10 inches at Donaldsonville, occurring during the general thunder-storm of the 22d and 23d.

No snow fell during the month, and but an inappreciable quantity of sleet, at Farmerville.

The "Michigan Weather Service," N. B. Conger, Sergeant, Signal Corps, Lansing, director:

Temperature (in degrees Fahr.).—The temperature was below the normal in all sections during February. The greatest departure from the normal was in the upper peninsula, where it reached 7.1. The least in the northern section, where it reached 2.2 below the normal. The highest temperature during the month, 52, occurred at Bell Branch and Omer on the 17th. The lowest temperature, —36, occurred at Sault Ste. Marie on the 9th. The highest mean daily temperature for the month, 35, occurred on the 13th, when the temperature was 11 above the normal, and the lowest mean daily temperature, —10, occurred on the 9th, when the temperature was 33 below the normal. Comparing the mean daily temperatures of this month with the record of thirteen years, the highest temperature, 49, occurred on the 12th, 1882, and the lowest temperature —10, occurred on the 9th, 1888. The highest mean monthly temperature, 33.4, occurred in 1882, and the lowest mean monthly temperature, 10.2, occurred in 1885. Forty-two stations report a minimum temperature of —15, or lower, during the month, occurring on the 9th or 10th of the month. All stations of the upper peninsula and northern section report minimum temperatures of —20, or lower, during the month. The most severe cold wave of the month passed over the state on the 9th and 10th, when temperatures from —10 to —36 were reported.

Precipitation (in inches.)—The average amount of precipitation for February, 1.88, is 0.92 below the normal of thirteen years. The precipitation was 0.27 above the normal in the upper peninsula, and below the normal from 0.61 in the northern section, to 1.30 below the normal in the southern section. Comparing the average precipitation of this month with the records of the past thirteen years it is found that the greatest average precipitation, 4.69, occurred in 1881, and the least, 0.05, occurred in 1877. This last record is the smallest monthly precipitation for any month that the records of this office show, there being but an average of two days on which 0.01 inch or more precipitation was recorded. There is but very little snow on the ground at the end of the month in the central and southern sections, mostly in drifts, leaving the fields bare. The northern section and upper peninsula have from 3 to 56 inches of snow on the ground at different stations. The average amount of snowfall on the level during the month is 8.2.

The "Minnesota Weather Service," Prof. W. W. Payne, Northfield, director:

The month was marked by a deficiency of precipitation and an abnormally low temperature. As is usual for a winter month in Minnesota the precipitation was comparatively small, yet the snow drifted badly on the 26th, so that trains from the west were delayed several hours. Logging operations proceeded uninterruptedly during the month and conditions were generally favorable for a full cut.

Temperature (in degrees Fahr.).—The average for the state, 9, is 4.1 colder than that of the corresponding month of 1886, and 2.3 warmer than that of 1887. In the southern portion of the state the temperature was from 4 to 5 below the normal of fifteen years, while there is a gradual decrease in the departure until the northern boundary is reached, where it was only 1 below the normal. The lowest monthly mean was —0.1, reported from Saint Vincent; the highest mean was 15.6, reported from La Crosse. The warmer portions of the month were: 1st to 3d, 13th, 16th to 19th, 22d to 24th. The maximum for the state, 50, reported on the 16th from Duluth; the next highest, 48, on the 18th, at La Crosse. The coldest periods of the month were: 7th to 10th (inclusive), 14th, 15th, 26th, 27th; on these days the mean daily temperature over the entire state was generally below zero. The minimum for the month occurred during the passage of the cold wave in the first of these periods. The lowest registered was —50, on the 9th, at Rush City, while on

the same day at Saint Vincent it was —49.9; Pine River Dam, —48; Moorhead, —47; Princeton, —44; Alexandria, —43.5; Glenwood and Morris, —40. The greatest monthly range for any station was 95, at Pine River Dam; the range for the state was 100.

Precipitation, including melted snow (in inches).—This was fairly well distributed and mainly in the form of snow. The average for the state is 0.48; this is respectively 0.17 and 0.66 below the amounts of the corresponding months of the two preceding years. The greatest deficiency was in the vicinity of Lake Superior, where it was over three-quarters of an inch below the average. In the southern counties the deficiency amounted to half an inch. while in the northern counties it was only a quarter of an inch. Precipitation was general throughout the state on the 3d to 7th, 10th to 13th, 19th, 20th, 22d, 24th, 25th. The heaviest fall occurred during the prevalence of the storm on the 19th and 20th. The greatest total monthly precipitation was 0.91, at Mankato and Red Wing, while some of the smallest amounts were Morris, 0.11; Glenwood, 0.14; Saint Vincent, 0.22; Duluth, 0.24. At the close of the month from 3 to 10 inches of snow remained on the ground in the northern portion of the state, while elsewhere there was from 10 to 20 inches. The average number of cloudy days for the month was 9.4.

The "Mississippi Weather Service," Prof. R. B. Fulton, of the University of Mississippi, Oxford, director:

Reports were received this month from seventeen stations.

The monthly mean temperature, 51°, is 7° below the average for this month last year. The highest temperature for the month occurred on the 1st, 14th, and 19th, and the lowest occurred at all stations on the 28th.

The average rainfall for this month, 5.23 inches, is 0.25 inch in excess of the average for February, 1887, and was well distributed. The rainfall in the southern portion of the state was very heavy, while that in the northern portion was light, ranging from 8.90 inches at Biloxi, to 2.87 inches at University.

The "Missouri Weather Service," Prof. Francis E. Nipher, of Washington University, Saint Louis, director:

The average temperature for February was 32°.8 The highest reported was 73°, at Pro Tem and Sedalia, on the 13th, and the lowest, —1°.4, at Kirksville, on the 9th. The average of maximum temperatures was 62°.6, and the average of minimum temperatures, —2°.7, making an average monthly range of 65°.3

The average precipitation was 2.06 inches, which was 0.76 inch below the normal for February. The greatest amount reported was 3.16 inches at Louisiana, and the least was 0.61 inch at Ozark. The precipitation was most abundant in the eastern portion of the state. The least rain and snow fell in the north and southwest sections. The precipitation was, however, fairly distributed over the state.

At the central station (Saint Louis) the mean temperature was 33°.6, which was slightly below the normal. The highest temperature was 60°.8, and the lowest 2°.7, making a range of 58°.1 for the month. The average daily range was 11°.1. The total precipitation was 2.91 inches.

The "Nebraska Weather Service," Prof. Goodwin D. Swezey, of Doane College, Crete, director:

The month has been the coldest February for many years, although the extremes of cold have not been great and there have been some unusually warm days; the precipitation and the number of rainy days have been almost exactly normal. The mean temperature of the state has been 10°.2, which is colder than any February and colder even than any January but one for the past eleven years. Yet the minimum for the month was only —19°.4, while it usually falls to —20° and —25°. Indeed, there has been but one February with a minimum as high, and no February with so high a maximum temperature for the past eight years.

A narrow strip along the Missouri River, from the Platte southward, together with the western part of the state, received over an inch of precipitation, reaching nearly two inches in the southeastern corner of the state; the rest of the state has received less than an inch, and the northeastern, central, and extreme southern portions have received less than half an inch; the average for the state is about three quarters of an inch.

The "Nevada Weather Service," Prof. Charles W. Friend, Carson City, director:

Both pressure and temperature were above the normal for this month throughout all parts of the state from which reports are received. The highest temperature reported, 75°.9, occurred at Reno, on the 28th, and the lowest, 4°, occurred at Elko and Fly, on the 6th. In the western part of the state the lowest temperature occurred on the 29th, and in the eastern part, on the 6th. Throughout the whole state the highest temperatures occurred from the 26th to the 28th.

The weather has been generally clear, the winds light, the prevailing direction being southwest to northwest, and the rainfall not generally above half the average for this month. The rainfall was heaviest in the southeastern part of state, Pioche reporting 3.15 inches. Throughout the greater part of the state it was less than half an inch. There was generally little snowfall, but Pioche reports a snowfall that measured one foot in depth.

The "New England Meteorological Society," Prof. Wm. H. Niles, of the Institute of Technology, Boston, Massachusetts, president:

Atmospheric pressure (in inches).—Monthly mean, 30.06 (thirteen stations); maximum observed, 30.60, at New Haven, Conn., on the 16th; minimum observed, 29.36, at Eastport, Me., on the 8th; range for New England, 1.24; greatest local monthly range, 1.16, at Eastport, Me.; least local monthly range, 0.88, at Nantucket, Mass.

Temperature (in degrees Fahr.).—Monthly mean, 23.9 (one hundred stations); highest monthly mean, 30.8, at Nantucket; lowest monthly mean, 14.5, at Berlin Mills, N. H.; maximum, 60, at Olneyville, R. I., on the 14th; minimum, —30, at Woodstock, Vt., on the 10th; range for New England, 90; greatest local monthly range, 81, at Woodstock, Vt.; least local monthly range, 47, at Nantucket, Mass.; greatest daily range, 62, at Berlin Mills, N. H., on the 15th; least daily range, 0, at Walpole, on the 15th.

Precipitation, including melted snow (in inches).—Average for New England, 3.78 (one hundred and twenty stations); greatest, 6.11, at Orono, Me.; least, 0.79, at Burlington, Vt.

Wind.—Prevailing direction, northwest (thirteen stations).

The "New Jersey Weather Service," Prof. George H. Cook, of the Agricultural College, New Brunswick, director:

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 30.6; highest monthly mean, 34.0, at Ocean City; lowest monthly mean, 27.1, at Hanover; maximum, 60.0, at Trenton, on the 20th; minimum, —5, at Tenafly, on the 16th; range for the state, 65.0; greatest local monthly range, 59.0, at Tenafly; least local monthly range, 48.0, at South Orange; greatest daily range, 43.0, at Tenafly, on the 2d; least, 3.0, at Newark, Beverly, and Clayton, on the 6th, 7th, and 12th, respectively.

Precipitation, including melted snow (in inches).—Average for the state, 3.53; greatest, 6.01, at Tenafly; least, 2.04, at Toms River.

Humidity.—Mean relative humidity for the state, 76.5 per cent.

Wind.—Prevailing direction, northwest.

Thunder-storms.—At nearly all stations on the 20th.

The "North Carolina Weather Service," Dr. Herbert Battle, of Raleigh, director:

Summary.

Temperature (in degrees Fahr.).—Monthly mean, 45.4; maximum, 73, at Salem, on the 18th, and at Weldon on the 20th; minimum, 9, at Knoxville, Tenn., on the 28th; range for the state, 64; average monthly range for the state, 54.3.

Precipitation, including melted snow (in inches).—Average for the state, 4.29; greatest, 6.42, at Salem; least, 2.41, at Norfolk, Va.

Wind.—Prevailing direction, northeast.

The "Ohio Meteorological Bureau," Prof. B. F. Thomas, of the Ohio State University, Columbus, president; Charles E. Kilbourne, Secretary:

The mean atmospheric pressure, 30.09 inches, is 0.39 inch below the mean for the past six years. The highest barometer, 30.92 inches, at Wauseon, on the 15th, is the highest record for the month of February. The lowest barometer was 29.22 inches, at Toledo, on the 25th.

The mean temperature, 30°.5, is 0°.8 above the six-year average. The highest temperature, 68°.5, occurred at Portsmouth on the 18th, and the lowest, 9°.8 below zero, at Hiram, on the 10th. The mean daily range of temperature was 17°.8. The greatest daily range, 40°, occurred at Youngstown on the 14th, and the least, 3°, at Sidney, on the 1st and 20th; Greenville on the 1st, and at Celina on the 1st and 4th. The mean relative humidity was slightly below the normal.

Precipitation was general throughout the state on the 4th, 5th, 14th, 19th, 20th, 24th, and 25th, and light rains or snows occurred in all sections on the 7th, 26th, 27th, and 29th; in the northern section on the 15th, and in the southern on the 9th, 11th, and 12th. Snow was reported from stations in all sections on the 5th, 7th, 15th, 25th, 26th, and 27th; from the middle section on the 1st, and in the southern section on the 4th, 8th, 9th, 14th, and 28th. The mean rainfall for the state, 1.74 inches, is 2.12 inches below the average for the past six years. The rainfall for January was 0.02 inch above the average, leaving a deficiency since the 1st of January of 2.10 inches. The greatest monthly rainfall was 2.94 inches, at Hanging Rock, and the least, 0.75 inch, at Toledo. The greatest daily rainfall, 1.09 inches, occurred at Quaker City, on the 25th. Cold-wave signals were ordered from Washington on the 7th, 9th, 14th, and 25th, for the state, and for stations in the northern part of the state on the 21st. These were all justified by cold waves on the 8th and 9th, 15th and 16th, 21st and 22d, 26th and 27th. The cold wave of the 21st extended to all parts of the state. A slight cold wave occurred in the northern section on the 6th.

"Oregon Weather Service," report prepared by B. S. Pague, Sergeant, Signal Corps, Roseburg, Oregon:

This report closes the first year of the "Oregon Weather Service," conducted by private individuals, and it is hoped that by the close of another year the service will have a legal existence by the authority of the state.

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The month has been marked by an absence of violent storms, unusually high temperature, and scant rainfall, and great number of warm, clear, or fair days. The weather was very favorable for both the agriculturist and horticulturist.

Temperature (in degrees Fahr.).—The mean temperature for the month was higher than the normal temperature for February in all sections of the state, ranging from 6 above the normal at Newport to a normal temperature at Bandon; both places being on the immediate coast. In the interior region it ranged from 5 above the normal at The Dalles to 2 above at Roseburg. Ashland reports the highest maximum temperature, 69, on the 26th, and Fort Klamath the lowest minimum, on the 29th.

January was a very cold month, while February, however, was the reverse. The mean temperature of the state was 41.5.

Precipitation, including melted snow (in inches).—The precipitation was most markedly below the normal in all sections; the deficiency ranging from 6.85 at Bandon to 0.90 at Lakeview.

For the season from July 1st, 1887, to March 1st, 1888, the precipitation is below the normal in all sections except at Astoria, where it is 2.46 above the normal. The deficiency of the season ranges from 9.34 at Bandon to 1.60 at Eola. Comparatively speaking, the greatest deficiency in the seasonal precipitation is in extreme southern Oregon, where much deficiency can least be stood in the annual or seasonal precipitation. At Portland there is a deficiency in the seasonal precipitation of 18 per cent., at Bandon 20 per cent., at Eola 5 per cent., at Roseburg 10 per cent., at Ashland 36 per cent., and at Lakeview 46 per cent.

The "Pennsylvania State Weather Service," report prepared under the direction of the Franklin Institute, Philadelphia, by Sergeant T. F. Townsend, Signal Corps:

The mean temperature for February for the state was 28°.4, which is about 1° below the normal. Fayette, Alleghany, and Philadelphia report the highest monthly means, and Wayne, Sullivan, Warren, and Erie the lowest. The warmest period of the month prevailed on the 14th and 20th. Uniontown reports 63°; Pittsburg, 61°; Indiana, 61°; and Greensburg, 60°. The cold wave of the 10th was general throughout the state, and the following low temperatures were reported: Dyberry, —31°; Columbus, —25°; Blooming Grove, —22°; Tionesta, —19°; Bernice, —19°; Wysox, —18°.5; Philipsburg, —18°; Scranton, —17; Eagle's Mere, —16°; and Clarion, —16°. In some localities the lowest temperatures noted occurred on the 16th.

The average precipitation, including rain and melted snow, was 2.50 inches, which is from a half to one inch below the normal. The total precipitation in eastern Pennsylvania was nearly double that in the western portion. Wellsborough reports 4.54 inches; West Chester, 4.97 inches; Quakertown, 4.26 inches; and Bernice, 4.46 inches, while Philipsburg had but 0.89 inch, and Washington, 0.91 inch.

The "South Carolina Weather Service," Hon. A. P. Butler, Com'r of Agriculture for South Carolina, Columbia, director:

The areas of low barometer which prevailed in the Southern States on the 3d, 4th, 18th, 21st, 22d, 23d, and 24th brought with them rain; from the 19th to the 24th were six days of threatening and rainy weather, during which the major part of the monthly precipitation occurred. A heavy rainfall was reported on the 11th. Aside from these we had the average number of clear and fair days. Average rainfall for the month, 4.83 inches, exceeding the means of February, 1887, by nearly one and a half inches. The greatest amount of precipitation occurred in the northern counties.

The mean temperature of the state was 49°.9, 2°.7 lower than for the same month last year. The maximum temperature was observed at most of the stations throughout the state on the 18th and 20th, and the minimum temperature on the 28th.

The following is an extract from the report of the "Meteorological Department of the State (Tennessee) Board of Health," prepared under direction of J. D. Plunket, M. D., President of the State Board of Health, by H. C. Bate, Signal Corps, Assistant, Nashville:

The month of February was characterized by a large percentage of cloudiness, high winds, and disagreeable weather generally.

The mean temperature was 44°.5, slightly above the mean of the past five years. It was about 5° lower than the February mean of last year, but was 8° higher than that of 1886, and nearly 11° higher than that of 1885. The highest temperature was 71°, recorded at various stations on the 17th, 18th, and 19th, and was the lowest February maximum during the last five years except that of 1886, which was 70°. The lowest temperature was 4°, recorded on the 28th. With the exception of last year it was the highest February minimum during the past five years, the lowest during that time being in 1886, when the remarkable and perhaps unprecedented record of —22° was reported. The minimum reported last year was 20°, making a difference of 42° in the February minimums of the two years. The mean daily range was slightly less than the normal of five years.

The mean rainfall was 3.45 inches, nearly two inches less than the February mean of the past five years, the greatest during that period being 8.45 inches in 1884, and 8.03 inches last year, and the least, 2.39 inches in 1885. Of this amount the eastern division received an average of about four inches, the middle division about three and a half inches, and the western division about two and a half inches. The greatest monthly rainfall was 5.34 inches, reported at Andersonville, and the least was 1.90 inch, reported at Milan. The greatest rainfall in twenty-four consecutive hours was 2 inches, reported on the 9th at Fostoria. The days of greatest rainfall were the 3d, 7th, 10th, 11th, 19th, and 24th, and of these the greatest fall occurred on the 19th. Most of the rains during the month were general, though comparatively light, only a few stations reporting over one inch of daily rainfall. On the 26th and 27th there were falls of sleet and snow; the greatest depth reported for the month was 3.52 inches, at Cookeville. Slight falls of snow and sleet were reported during the first decade at a few stations. Frosts were reported at various stations on nineteen days, the 3d, 4th, 5th, 7th, 8th, 19th, 20th, 23d, 24th, and 25th being the days on which none was reported. Most of these were heavy or killing.

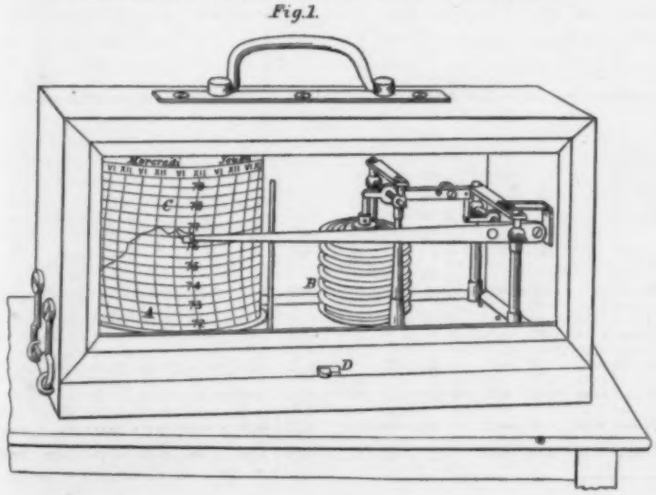
The feature of the month was the thunder-storm of the 19th, which prevailed with greater or less severity throughout the western and middle portions of the state and a small portion of the eastern division. It was quite severe in the northern portion of the western division, and the northwestern portion of the middle division, and extended into southwestern Kentucky, where it was very severe.

NOTES AND EXTRACTS.

The following descriptions of self-registering instruments are published in compliance with frequent requests for information concerning suitable instruments for making a continuous record of atmospheric pressure and temperature:

RICHARD'S SELF-REGISTERING BAROMETER.

Fig. 1.



The "Richard" self-registering aneroid barometer, shown in Fig. 1, consists of a cylinder, *A*, on which the recording paper is wound, revolving once a week by means of a clock-work contained inside; a series of metallic boxes, *B*, eight in number, screwed together and exhausted of air; a compound lever, by means of which the motion of top of metallic boxes is transmitted, magnified about forty times, to the marking pen, *C*.

The essential part of the barometer is the aneroid chamber or shell, made of two thin sheets of metal, soldered at the edges, and exhausted of air. The two thin sheets thus tending to approach by the atmospheric pressure are kept apart by the opposing action of a spring within, formed of two discs of steel in contact at their ends.

Each shell thus formed is flattened slightly when the external pressure increases and swells out when the pressure diminishes.

Each of the shells has a projecting piece on each base in the axis; the piece on one side is a screw, having a thread cut on it, the other is a nut. The shells are made into a vertical column by screwing the one on the other. The lower base of column being fixed, the upper end rises and falls with every variation in the atmospheric pressure, by a quantity which is the sum of the displacements of each elementary shell. As far as vacuum is concerned the shells are independent of each other.

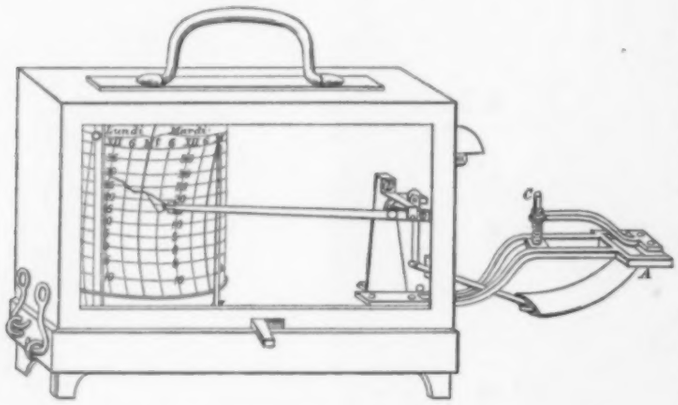
The instrument is compensated for temperature. This is accomplished by leaving a sufficient quantity of air in one of the shells, ascertained by experiment when the instrument is made, so that with a rise of temperature the tendency of the barometer to register too low on account of the expansion of the levers and other parts is counteracted by the increased pressure of the air in the shell. The instrument, however, should be kept at a uniform temperature.

RICHARD'S SELF-REGISTERING THERMOMETER.

The "Richard" self-registering thermometer, shown in Fig. 2, has many parts similar to the self-registering aneroid. The essential or thermometric part is the copper bulb, *A*, filled with alcohol.

As the temperature changes, increasing or diminishing the volume of alcohol, the curvature of this crescent-shaped bulb changes. The motion of the free end is transmitted by a compound lever to the marking pen. When the instrument is set up or the sheet renewed, which should be once a week, at 9 a. m. Monday morning, the same as in the case of the barometer, the pen should be made to register the same as the dry thermometer, within 1° or thereabout. This adjustment is made by means of the nut at *c*, turning it so as to raise or lower the pen.

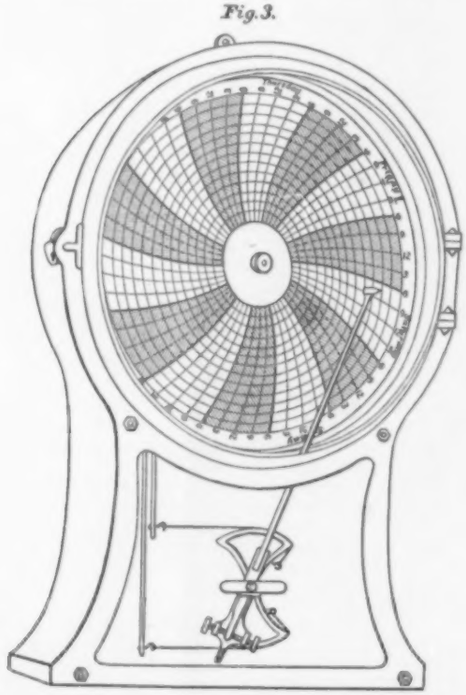
Fig. 2.



DRAPER'S SELF-REGISTERING THERMOMETER.

This is a metallic thermometer (see Fig. 3). Strips of steel and brass about twelve inches long are soldered throughout their length. The difference in their expansions causes changes in the curvature of the strip, one end of which is fixed. The movements of the other end, by a suitable device, produce a motion of the registering pen. There are two of these compound strips, so arranged as to curve in opposite directions as the temperature changes. They act on opposite sides of the pivot of marking pen. This is for the purpose of insuring greater accuracy in the record at times when the temperature is changing from rising to falling, or the reverse.

Fig. 3.



The record being a line traced on a disk, has the advantage over such as make tracings on a cylinder, that the record for a whole week can be seen without inconvenience. The disk holding record paper is made to revolve by an accurate clock-work once in a week. The indications of the instrument are trustworthy to within two degrees Fahrenheit.

Monthly and annual precipitation, in inches and hundredths, at Saint Louis, Mo., from observations furnished by Dr. Geo. Englemann.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1838 ...	3.72	1.25	1.51	3.36	4.68	3.73	3.13	4.48	0.06	3.06	2.09	0.44	31.51
1839 ...	2.21	2.50	2.59	5.46	7.93	7.26	5.71	2.89	2.45	3.96	2.48	2.00	47.44
1840 ...	1.80	1.38	2.10	3.31	4.58	6.27	2.36	7.15	3.96	6.30	1.73	0.71	41.65
1841 ...	0.84	0.88	4.99	3.85	2.38	1.67	3.09	5.63	3.22	6.81	5.44	3.93	42.73*
1842 ...	0.45	3.90	2.22	3.49	3.22	5.12	1.76	2.64	2.17	2.57	2.38	2.39	32.31
1843 ...	2.34	1.90	3.49	4.87	4.15	3.95	2.49	1.32	2.19	1.55	4.82	1.72	34.79
1844 ...	3.36	1.73	4.84	3.86	11.26	6.85	8.13	0.45	0.30	2.25	1.17	1.61	50.91
1845 ...	1.83	1.07	3.18	2.28	4.42	10.01	4.75	6.23	1.03	1.16	1.10	0.93	37.99
1846 ...	2.98	1.27	1.27	4.84	3.75	5.21	0.84	4.73	4.84	2.71	2.11	10.90	45.45
1847 ...	2.12	3.58	2.28	3.96	4.36	8.61	5.37	0.90	3.26	8.74	8.63	0.89	52.72
1848 ...	1.86	2.27	6.61	3.16	8.10	17.07	5.37	9.74	1.12	2.41	1.91	5.74	65.36
1849 ...	4.18	0.56	2.70	2.64	2.71	6.46	9.40	5.15	5.81	2.17	2.11	1.82	45.71
1850 ...	1.94	4.10	5.63	7.68	7.47	1.47	4.83	2.10	3.74	2.71	6.24	2.59	50.50
1851 ...	0.61	6.74	3.14	4.70	2.83	6.19	5.77	8.97	0.49	1.51	1.99	3.90	46.84
1852 ...	0.99	2.12	7.67	2.28	5.19	10.25	3.36	1.60	1.47	5.26	3.29	3.48	46.96
1853 ...	0.52	1.67	0.79	3.24	3.64	3.23	4.10	5.48	4.67	0.96	1.51	1.08	30.89
1854 ...	1.18	3.11	7.49	7.60	6.30	3.21	0.92	1.80	1.44	4.15	1.94	1.49	40.63
1855 ...	4.66	0.70	2.89	2.65	7.46	4.27	5.17	6.53	3.89	3.89	5.16	3.10	50.37
1856 ...	1.03	3.64	1.06	6.35	3.03	1.24	4.61	6.82	3.51	2.10	4.90	4.29	42.58
1857 ...	0.41	7.74	1.80	1.72	4.81	3.71	2.82	4.15	3.18	3.02	3.80	1.87	39.03
1858 ...	3.42	2.13	3.96	6.07	10.64	6.69	8.03	2.87	3.86	7.73	4.92	8.52	68.83
1859 ...	2.32	5.35	7.32	4.89	6.60	11.02	5.54	2.93	4.44	1.80	5.43	3.76	61.40
1860 ...	1.80	2.60	1.16	2.03	2.29	6.58	2.97	2.96	2.11	1.58	1.63	2.08	29.79
1861 ...	1.16	2.01	7.38	3.18	4.39	4.96	2.04	3.44	4.14	2.85	1.39	1.09	38.03
1862 ...	4.01	0.80	4.11	4.82	2.51	2.85	3.61	1.32	6.27	3.73	3.59	6.38	44.00
1863 ...	4.11	3.99	3.02	1.55	2.68	3.16	2.51	6.93	1.56	4.76	2.15	4.03	40.45
1864 ...	2.74	0.82	1.71	5.58	3.90	0.41	3.60	4.91*	2.82	3.15	5.25	2.72	37.61
1865 ...	0.87	3.75	8.61	3.31	5.66	5.21	7.94	1.96	2.60	3.33	0.00	3.63	46.87
1866 ...	4.16	2.24	2.80	1.56	2.24	5.59	3.67	5.16	10.53	2.01	1.37	1.87	43.20
1867 ...	2.28	4.81	2.37	0.53	8.26	5.64	3.71	2.29	0.17	1.31	2.74	3.65	37.76
1868 ...	1.71	0.55	7.66	7.08	3.96	1.58	2.03	8.53	5.25	2.11	2.04	3.09	45.59
1869 ...	2.02	2.49	4.24	4.61	3.60	6.25	2.49	5.51	1.70	3.42	7.48	3.16	46.97
1870 ...	.....	.....	.....	.....	2.73	1.38	1.59	6.55	1.14	3.35	1.94	2.76	.....
1871 ...	3.60	2.64	1.14	0.25	3.40	2.87	1.14	3.00	0.02	1.75	1.21	0.85	21.87
1872 ...	0.79	1.69	1.70	2.85	0.57	4.38	5.03	0.56	2.84	0.29	1.89	1.76	30.35
1873 ...	3.58	1.44	2.07	5.29	4.45	6.89	6.18	0.04	2.38	2.62	1.39	4.43	40.76
1874 ...	2.47	2.23	3.75	2.80	3.48	2.00	5.30	4.01	2.33	0.84	2.37	1.45	33.03
1875 ...	0.54	2.61	3.28	2.80	4.55	10.09	10.00	2.54	0.33	1.30	0.91	2.28	41.23
1876 ...	4.44	2.92	6.79	2.11	2.84	5.76	5.78	5.55	7.32	1.54*	1.55	0.19	46.79
1877 ...	1.41	0.63	4.07	2.43	2.59	8.50	2.37	3.17	2.20	4.16	3.06	2.61	37.20
1878 ...	2.44	1.85	2.50	6.17	4.88	1.88	2.59	5.79	3.61	3.07	0.20*	3.03	38.01
1879 ...	1.65	1.38	1.81	2.62	0.96	3.83	1.85	2.23	1.34	0.43	4.05	3.15	25.30
1880 ...	3.27	2.60	3.10	3.22	2.70	1.13	.....	.....	.....	.....	.....	1.77	.....
1881 ...	0.39	5.41	2.06	2.73	4.34	.....	.....	.....	.....	.....	.....	.....	.....
Mean.	2.19	2.54	3.60	3.72	4.60	5.22	4.14	4.07	2.90	2.96	2.89	2.86	41.69

*Probably incomplete.

Monthly and annual precipitation, in inches and hundredths, at Hopkinton, Iowa, from observations made by Mr. Theodore Marks.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1877 ...	.....	.....	.....	.....	.....	6.50	2.30	5.69	2.35	4.20	2.85	2.25	.....
1878 ...	0.65	0.80	1.98	3.40	4.55	5.39	2.32	2.70	10.85	3.59	0.43	1.21	37.87
1879 ...	0.40	1.62	1.46	1.40	3.35	5.15	4.40	6.85	3.25	0.95	5.90	2.17	36.30
1880 ...	2.30	1.04	2.43	3.45	4.80	8.15	7.80	8.95	7.82	0.54	2.32	1.50	51.10
1881 ...	0.70	3.22	2.23	0.83	2.25	9.00	6.10	1.87	8.05	6.67	2.65	1.65	42.22
1882 ...	1.60	1.47	2.75	4.98	5.42	3.53	1.76	3.75	2.79	4.60	1.85	1.85	36.35
1883 ...	1.60	1.48	0.90	1.17	7.65	4.90	7.80	0.96	2.17	4.89	2.20	1.95	37.67
1884 ...	0.63	1.25	3.30	2.23	4.41	4.05	3.70	3.62	6.76	2.97	1.36	3.50	37.78
1885 ...	1.45	0.70	0.20	4.22	3.40	6.61	5.92	9.52	4.39	1.90	0.47	2.75	41.53
1886 ...	3.80	1.25	1.85	2.04	5.60	0.97	0.76	0.34	4.43	6.05	1.00	0.85	28.94
1887 ...	2.30	2.65	2.25	1.05	1.45	1.90	3.05	4.29	8.45	2.35	1.20	2.15	32.97
Mean..	1.54	1.49	1.93	2.48	4.29	5.10	4.17	4.41	5.57	3.51	2.02	2.26	38.27

Precipitation, in inches and hundredths, by months and years, at Fort Sanders, Wyoming.

Lat. 41° 16′ N., Long. 105° 32′ W.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1869...	0.88	0.58	0.30	0.65	2.05	2.65	0.27	1.77	0.65	0.38	0.56	0.03	10.77
1870 ...	0.06	0.65	0.72	3.63	1.10	0.87	0.62	0.87	1.36	0.04	0.00	0.16	10.08
1871 ...	0.14	0.62	0.13	1.22	0.55	0.05	1.62	0.00	0.40	0.68	2.00	0.75	8.16
1872 ...	0.50	0.70	0.69	2.45	2.28	2.05	2.95	3.05	1.30	0.60	0.60	0.60	17.77
1873 ...	0.95	0.90	0.73	1.03	1.95	1.25	2.70	2.10	0.70	1.53	0.40	0.90	15.14
1874 ...	0.50	0.20	0.85	0.45	0.87	1.76	3.07	0.72	1.31	1.49	0.09	0.29	11.60
1875 ...	3.53	0.58	1.00	0.33	0.15	0.05	1.80	2.05	0.85	0.51	1.15	0.14	10.14
1876 ...	0.13	0.61	1.11	0.32	2.36	0.16	0.89	0.66	0.43	0.98	2.27	1.05	8.97
1877 ...	1.95	0.00	0.57	1.13	0.56	1.53	2.56	0.46	1.91	1.70	0.09	0.86	13.32
1878 ...	0.12	1.26	0.34	0.10?	2.80	4.90	1.75	4.90	.....	.....	.....	.....	.....
Mean.	0.88	0.61	0.64	1.13	1.47	1.53	1.82	1.66	0.99	0.88	0.78	0.53	12.92

AVERAGE DATE OF LAST KILLING FROST AT SIGNAL SERVICE STATIONS.

The accompanying chart, number v, shows, in graphic form, the average date on which the last killing frost occurs from the Rocky Mountains eastward to the Atlantic coast. This chart has been deduced from observations of the Signal Service since the opening of the various stations, many of which have a record of fourteen years. The chart being a deduction of observations made in past years, has a certain predictive value, since a considerable number of the frosts, as will appear from the following table, occur within ten days of the time shown by the chart, either earlier or later. The greatest uncertainty as to the date of the last frost occurs, as might be expected, at stations near the sea and in low latitudes.

This table shows (1) the number of years of observation from which the data is drawn; (2) the average date of last killing frost; (3) the earliest date on which the last killing frost occurred; (4) the last date on which the last killing frost has occurred; (5) the extreme period of time between which the earliest and last frosts have been noted; (6) the percentage of times where the last killing frost has not been more than ten days earlier or later than the average date:

Station.	Number of years.	Average date of last killing frost.	Earliest occurrence of last killing frost.	Latest occurrence of last killing frost.	Extreme departure, days.	Departures of ten days or less, %.
Eastport, Me	14	Apr. 30	Apr. 3, '77	June 19, '75	50	64
Portland, Me	14	Apr. 13	Mar. 24, '83	Apr. 30, '74	17	71
Boston, Mass	14	Apr. 20	Mar. 26, '78	May 3, '74 '82	13	64
Block Island, R. I	7	Mar. 31	Mar. 8, '77	Apr. 7, '81	7	71
New Haven, Conn	14	Apr. 28	Mar. 3, '80	May 30, '84	32	43
New London, Conn	14	Apr. 19	Mar. 10, '78	May 24, '79	35	21
Albany, N. Y	14	Apr. 23	Apr. 1, '84	May 14, '78	21	36
New York City	14	Apr. 12	Mar. 24, '86	May 20, '74	38	57
Philadelphia, Pa	14	Apr. 5	Mar. 2, '87	Apr. 29, '74	24	64
Atlantic City, N. J	14	Apr. 10	Feb. 27, '82	Apr. 29, '74	19	36
Barnegat, N. J	12	Apr. 13	Jan. 15, '82	May 14, '78	31	50
Cape May, N. J	12	Apr. 8	Mar. 9, '83	May 3, '82	25	58
Sandy Hook, N. J	13	Apr. 7	Feb. 27, '82	Apr. 30, '74	23	69
Delaware Breakwater, Del	5	Apr. 8	Mar. 31, '84	Apr. 12, '80 '82	4	100
Baltimore, Md	14	Apr. 9	Mar. 16, '85	May 3, '82	24	36
Washington City	14	Apr. 6	Mar. 1, '83	Apr. 29, '74	23	43
Cape Henry, Va	13	Mar. 19	Feb. 5, '80-2	Apr. 19, '75	31	46
Chincoteague, Va	8	Apr. 9	Mar. 18, '86	Apr. 20, '87	11	62
Lynchburg, Va	14	Apr. 11	Mar. 10, '84	May 3, '82	22	64
Norfolk, Va	14	Mar. 28	Feb. 26, '82	Apr. 20, '87	23	29
Charlotte, N. C	9	Apr. 5	Mar. 10, '84	May 3, '79	28	33
Hatteras, N. C	7	Feb. 27	Jan. 4, '82	Apr. 5, '81	37	29
Kitty Hawk, N. C	12	Mar. 16	Jan. 18, '78	Apr. 19, '75	34	25
Fort Macon, N. C	6	Mar. 20	Feb. 25, '82	Apr. 6, '81	17	50
Smithville, N. C	11	Mar. 10	Feb. 1, '82	Apr. 6, '81	25	27
Wilmington, N. C	14	Mar. 13	Jan. 23, '82	Apr. 19, '75	37	43
Charleston, S. C	14	Feb. 23	Jan. 4, '82	Apr. 2, '81 '87	38	7
Augusta, Ga	14	Mar. 16	Feb. 6, '82	Apr. 14, '85	29	21
Savannah, Ga	13	Feb. 26	Jan. 4, '82	Apr. 13, '55	46	8
Jacksonville, Fla	13	Feb. 17	Dec. 18, '80	Mar. 23, '83	34	8
Cedar Keys, Fla	7	Jan. 18	Dec. 7, '87	Feb. 11, '85	24	29
Sanford, Fla	3	Jan. 30	Jan. 2, '87	Feb. 6, '86	7	67
Atlanta, Ga	9	Mar. 22	Feb. 2, '82	Apr. 8, '86	17	33
Pensacola, Fla	8	Mar. 3	Dec. 27, '80	Apr. 6, '86	34	25
Mobile, Ala	14	Feb. 22	Dec. 27, '80	Apr. 2, '81	39	14
Montgomery, Ala	14	Mar. 6	Feb. 2, '82	Apr. 5, '81	30	36
Vicksburg, Miss	14	Feb. 23	Jan. 16, '74	Apr. 2, '81	38	36
New Orleans, La	12	Jan. 17	Nov. 26, '81	Feb. 12, '78	26	58
Shreveport, La	14	Feb. 25	Jan. 12, '87	Mar. 31, '86	34	29
Fort Smith, Ark	5	Mar. 27	Mar. 9, '84	Apr. 5, '87	9	80
Little Rock, Ark	8	Mar. 27	Feb. 22, '82	Apr. 14, '81	18	50
Galveston, Tex	11	Jan. 30	Dec. 26, '79	Feb. 22, '81	23	9
Indianola, Tex	11	Feb. 14	Nov. 30, '77	Apr. 14, '81	59	27
Palestine, Tex	5	Mar. 25	Mar. 9, '84	Mar. 30, '86	5	80
San Antonio, Tex	8	Feb. 22	Dec. 7, '78	Apr. 14, '81	51	25
Brownsville, Tex	9	Jan. 21	Dec. 26, '79	Feb. 18, '83	28	11
Rio Grande City, Tex	8	Jan. 27	Dec. 16, '81	Mar. 1, '84	33	0
Chattanooga, Tenn	9	Mar. 24	Jan. 25, '80	Apr. 8, '86	15	33
Knoxville, Tenn	14	Apr. 11	Mar. 25 '74 '82	Apr. 25, '83	14	64
Memphis, Tenn	14	Mar. 26	Feb. 26, '74	Apr. 16, '82	21	50
Nashville, Tenn	14	Apr. 1	Feb. 2, '82	Apr. 17, '75	16	57
Louisville, Ky	14	Apr. 7	Mar. 10, '84	Apr. 24, '87	17	57
Greencastle, Ind	2	Apr. 6	Apr. 4, '85	Apr. 8, '86	2	100
Indianapolis, Ind	14	Apr. 19	Apr. 1, '76	May 13, '78	24	36
Cincinnati, Ohio	14	Apr. 21	Mar. 10, '84	May 22, '83	31	64
Columbus, Ohio	9	Apr. 18	Apr. 7, '81	May 1, '82	13	56
Pittsburg, Pa	14	Apr. 26	Mar. 30, '87	May 17, '83	21	50
Buffalo, N. Y	14	Apr. 25	Mar. 30, '78	May 8, '79	13	50
Oswego, N. Y	14	Apr. 21	Mar. 26, '78	May 16, '85	25	43
Rochester, N. Y	14	May 3	Apr. 11, '86	May 17, '83	14	71
Erie, Pa	14	Apr. 24	Mar. 26, '78	May 7, '74	13	57
Cleveland, Ohio	14	Apr. 23	Mar. 26, '78	May 17, '75 '83	24	43

Average date of last killing frost, &c.—Continued.

Stations.	Number of years.	Average date of last killing frost.	Earliest occurrence of last killing frost.	Latest occurrence of last killing frost.	Extreme departures, days.	Departures of ten days or less, %.
Sandusky, Ohio	9	Apr. 15	Mar. 26, '78	May 23, '79	38	56
Toledo, Ohio	14	Apr. 19	Feb. 24, '86	May 24, '82	35	29
Detroit, Mich	14	Apr. 30	Apr. 1, '87	May 14, '80	14	64
Alpena, Mich	14	May 10	Apr. 5, '86	June 29, '85	50	64
Escanaba, Mich	14	May 14	Apr. 24, '83	June 29, '85	46	57
Grand Haven, Mich	14	Apr. 29	Mar. 2, '82	June 10, '85	42	57
Mackinaw City, Mich	5	May 13	Apr. 29, '84	June 8, '86	26	40
Marquette, Mich	14	May 21	Apr. 30, '80	June 11, '82	21	43
Port Huron, Mich	13	May 4	Apr. 9, '86	May 29, '84	25	62
Chicago, Ill	14	Apr. 26	Apr. 2, '84	May 25, '82	29	43
Milwaukee, Wis	14	Apr. 29	Mar. 29, '78	May 21, '83	22	57
Duluth, Minn	14	May 7	Apr. 7, '86-7	June 8, '85	32	64
Saint Paul, Minn	14	Apr. 28	Apr. 6, '78	May 23, '82	25	57
La Crosse, Wis	14	May 1	Apr. 7, '86	May 23, '82	22	36
Davenport, Iowa	14	Apr. 27	Mar. 28, '78	May 22, '82-3	25	43
Des Moines, Iowa	9	Apr. 14	Mar. 15, '82	May 9, '85	25	44
Dubuque, Iowa	13	May 1	Mar. 20, '78	May 23, '82	22	62
Keokuk, Iowa	14	Apr. 11	Mar. 4, '78	May 2, '75	21	64
Cairo, Ill	14	Apr. 5	Feb. 28, '78	May 8, '85	33	27
Springfield, Ill	8	Apr. 20	Mar. 23, '86	May 22, '83	32	25
Saint Louis, Mo	14	Apr. 3	Feb. 27, '78	May 2, '75	29	36
Lamar, Mo	3	May 1	Apr. 6, '86	May 8, '85	7	33
Leavenworth, Kans	14	Apr. 6	Mar. 16, '82	May 1, '75	25	64
Omaha, Nebr	14	Apr. 15	Mar. 28, '78	May 7, '85	22	50
Valentine, Nebr	2	May 1	Apr. 29, '86	May 3, '86	2	100
Fort Bennett, Dak	5	May 7	Apr. 1, '81	May 22, '82	15	40
Huron, Dak	6	May 17	Apr. 25, '87	June 22, '85	36	17
Yankton, Dak	14	May 3	Apr. 5, '81	May 23, '82	20	57
Moorhead, Minn	7	May 24	May 2, '81-4	June 8, '85	15	29
Saint Vincent, Minn	7	June 1	Apr. 29, '81	June 8, '85	7	71
Bismarck, Dak	13	May 11	Apr. 29, '80	June 3, '75	23	69
Fort Buford, Dak	9	May 15	Apr. 28, '81	June 2, '83	18	56
Fort Totten, Dak	3	May 26	May 15, '86	June 4, '87	9	67
Fort Assiniboine, Mont	7	May 17	May 4, '84	June 1, '83	15	71
Fort Benton, Mont	9	May 14	Apr. 4, '86	June 22, '81	39	22
Fort Custer, Mont	8	May 10	Apr. 13, '81	May 23, '82	13	38
Helena, Mont	8	May 17	Apr. 13, '81	June 9, '80	23	50
Fort Maginnis, Mont	3	May 12	Apr. 23, '87	May 14, '86	2	67
Poplar River, Mont	5	May 12	May 2, '86	May 16, '87	4	80
Fort Shaw, Mont	7	May 13	May 4, '86	May 21, '84	8	100
Deadwood, Dak	10	May 17	Apr. 17, '79	June 16, '85	30	40
Cheyenne, Wyo	14	May 23	Apr. 26, '87	June 19, '76	27	50
North Plate, Nebr	13	Apr. 29	Mar. 6, '86	May 12, '85	13	62
Denver, Colo	14	May 5	Mar. 29, '81	May 26, '83	21	71
Las Animas, Colo	6	Apr. 30	Apr. 23, '82	May 6, '84	6	100
Concordia, Kans	2	Apr. 15	Apr. 7, '86	Apr. 23, '87	8	100
Dodge City, Kans	13	Apr. 21	Apr. 4, '78	May 2, '84	11	69
Fort Elliott, Tex	8	Apr. 18	Mar. 10, '82	Apr. 30, '80	12	50
Fort Sill, Ind. T	10	Mar. 22	Feb. 5, '82	Apr. 6, '86	15	40
Abilene, Tex	2	Mar. 16	Feb. 24, '87	Apr. 5, '86	20	.....
Fort Concho, Tex	8	Mar. 21	Mar. 4, '78	Apr. 9, '80	19	62
Fort Davis, Tex	10	Apr. 7	Mar. 21, '81	Apr. 22, '84	15	70
Fort Stockton, Tex	9	Mar. 25	Feb. 11, '85	Apr. 21, '84	27	22
Fort Stanton, N. Mex	2	Apr. 26	Apr. 17, '86	May 5, '87	9	100

Rainfall (in inches and hundredths) at Hanover, Grafton Co., N. H., from observations made at Dartmouth College.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1834	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.30	2.00	.....
1835	1.90	0.70	2.23	2.99	3.31	4.86	2.99	4.22	1.80	2.42	2.21	1.61	31.24
1836	3.85	6.25	2.09	2.29	3.71	3.06	2.17	1.92	1.67	3.41	3.14	3.74	37.30
1837	3.57	2.98	1.57	2.80	5.93	3.89	4.33	2.14	1.33	2.81	2.61	1.55	35.51
1838	2.63	1.65	1.82	1.42	4.95	7.27	1.78	4.19	4.05	3.93	3.90	2.75	40.34
1839	2.20	1.35	1.53	1.39	2.26	5.42	4.29	2.03	3.05	1.01	2.47	5.05	32.05
1840	2.00	2.57	4.74	6.00	3.06	3.29	3.05	2.33	7.03	3.53	4.20	3.28	45.08
1841	6.76	1.80	3.56	5.45	1.91	2.54	2.62	2.26	4.24	1.19	2.54	4.31	39.18
1842	1.32	4.28	3.43	2.82	4.31	2.90	4.74	5.45	5.28	3.51	4.65	3.98	46.67
1843	3.50	4.50	4.24	5.24	3.90	5.92	2.76	9.00	2.05	7.59	4.50	2.65	55.85
1844	3.85	2.10	4.34	1.28	3.64	3.84	9.98	6.28	2.16	8.19	1.86	4.14	46.66
1845	4.45	3.90	3.50	3.84	1.83	1.67	1.88	3.37	3.13	2.25	4.90	3.61	38.33
1846	2.48	2.55	2.82	1.67	4.77	4.38	3.37	1.73	4.11	2.66	3.67	3.52	37.73
1847	5.10	2.46	3.22	2.55	3.84	4.47	3.78	4.62	3.74	5.65	1.65	4.80	45.88
1848	3.30	2.65	2.90	1.83	6.65	2.11	6.55	5.51	3.15	5.64	3.32	4.87	48.48
1849	0.75	1.70	2.55	1.35	3.60	3.35	1.60	9.46	1.67	5.86	4.25	2.06	38.20
1850	2.00	1.68	1.20	4.33	7.37	3.54	4.18	2.86	1.83	4.87	2.18	4.27	40.31
1851	9.75	3.28	4.85	2.72	2.66	2.55	4.75	1.28	1.80	7.94	4.94	3.75	50.27
1852	1.52	2.15	3.02	4.87	0.55	4.89	3.76	2.56	2.37	2.41	3.95	3.60	35.65
1853	0.31	4.70	1.92	2.03	5.81	1.75	1.88	3.20	4.87	3.98	4.42	2.62	37.49
1854	2.88	2.77	2.13	4.14	3.46	3.92	1.24	0.12	5.32	2.46	3.58	2.11	34.13
1856	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.33	.....
1862	.....	.....	.....	.....	.....	.....	.....	.....	0.94	2.30	.....	.....	.....
1863	.....	.....	0.45	.....	1.06	1.49	7.02	5.86	1.81	1.44	1.66	2.75	.....
1864	1.80	0.75	1.28	1.83	1.82	0.73	0.51	.....	2.61	3.68	3.42	1.79	.....
1865	.....	0.50	.....	3.00	1.40	3.30	1.17	.....	2.13	2.82	3.08	.....	.....
1866	.....	.....	.....	1.59	1.56	2.97	1.49	.....	3.41	3.24	1.89	0.68	.....
1867	1.35	1.35	1.14	.....	3.71	4.04	1.28	4.61	1.89	3.27	1.35	.....	.....
1868	1.70	0.65	2.42	2.44	6.44	5.43	1.35	3.94	6.46	1.00	.....	1.45	.....
1869	2.65	1.44	4.53	3.45	2.54	3.46	2.67	.....	6.13	9.29	0.86	1.79	.....
1870	5.81	3.45	2.25	2.90	2.53	3.17	1.82	1.13	1.68	3.50	1.59	1.15	30.98
1871	0.45	0.32	2.64	1.63	2.86	2.16	1.20	.....	1.32	1.89	2.14	2.49	.....
Mean	2.97	2.39	2.68	2.14	3.50	3.53	2.94	3.75	3.10	3.79	2.89	2.85	36.53

Monthly and annual mean temperatures, in degrees Fahr., at Portsmouth, Scioto Co., Ohio, from observations furnished by D. B. Cotton, M. D.

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1830 ...	34.6	37.9	49.0	59.5	62.4	70.8	77.0	76.0	68.5	60.9	50.7	36.9	57.0
1831 ...	24.4	32.2	47.2	55.6	61.1	71.6	73.2	71.3	64.3	57.1	42.6	22.9	52.0
1832 ...	31.8	41.7	45.4	54.6	62.5	69.2	72.4	68.7	62.0	56.2	45.7	38.0	54.0
1833 ...	38.5	39.6	43.6	57.9	68.3	70.1	75.8	69.6	68.5	51.8	43.9	39.0	55.6
1834 ...	34.8	46.2	48.7	58.4	63.2	74.1	79.1	77.3	65.4	54.5	46.0	39.3	57.2
1835 ...	36.9	27.6	42.4	52.9	66.0	72.1	74.1	71.9	62.6	58.6	48.4	38.2	54.3
1836 ...	35.6	34.3	40.5	56.9	67.8	70.8	74.9	72.7	70.8	52.1	42.1	36.4	54.6
1837 ...	34.8	41.0	45.4	50.2	63.5	69.7	75.8	73.6	66.8	57.3	50.2	40.3	55.7
1838 ...	40.6	26.5	46.8	51.2	50.8	73.6	78.8	78.2	66.1	50.2	39.1	29.3	53.1
1839 ...	37.9	37.2	44.8	58.8	67.8	70.3	76.7	73.4	62.7	60.5	39.0	33.1	55.2
1840 ...	28.3	43.2	48.3	59.0	64.7	72.1	75.0	74.9	62.7	55.8	42.4	34.1	55.0
1841 ...	32.7	34.3	45.1	52.9	62.5	76.6	77.7	74.5	69.3	52.0	45.9	38.4	55.2
1842 ...	41.4	40.8	56.3	61.7	63.4	68.0	74.7	71.4	69.5	59.0	40.0	38.9	57.1
1843 ...	41.4	31.2	33.0	55.0	63.6	72.0	77.2	73.8	72.9	52.7	44.9	38.7	54.7
1844 ...	34.3	39.5	47.6	60.1	69.2	73.5	80.1	75.0	69.0	54.8	48.2	39.1	58.0
1845 ...	42.0	43.5	48.2	64.0	64.4	74.6	78.9	77.7	68.8	55.0	45.1	29.8	57.7
1846 ...	39.3	37.3	48.4	60.5	68.4	71.4	76.3	78.0	73.7	56.1	50.2	44.2	58.6
1847 ...	37.4	41.5	45.1	59.9	65.2	71.3	76.0	73.2	67.2	56.1	48.2	39.8	56.7
1848 ...	41.6	39.8	40.4	57.1	68.7	72.4	74.8	74.4	64.0	56.5	44.3	46.5	57.2
1849 ...	34.5	34.3	50.6	55.9	66.5	77.7	76.4	76.4	69.1	55.8	51.9	36.5	57.1
1850 ...	39.4	39.3	43.9	53.3	61.5	75.2	81.8	78.4	69.3	59.1	42.6	38.7	56.6
1851 ...	38.6	47.2	49.5	50.4	68.1	73.2	79.0	76.4	72.1	56.7	44.7	32.6	57.9
1852 ...	29.7	41.0	49.3	53.2	67.8	71.6	79.1	74.4	68.7	62.6	45.0	43.0	57.1
1853 ...	37.6	38.8	45.7	56.4	65.8	79.2	77.9	76.7	70.1	53.1	50.2	35.6	57.3
1854 ...	34.7	42.5	48.3	55.3	68.1	75.3	83.0	81.3	77.9	62.7	44.9	38.1	59.3
1855 ...	37.0	29.0	41.2	60.1	66.4	70.7	79.2	76.2	74.2	56.0	52.1	44.1	57.2
1856 ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31.3	.....
1857 ...	22.2	46.6	42.5	46.6	60.3	71.0	74.3	74.6	70.6	53.9	40.9	43.3	53.9
1858 ...	44.5	30.7	44.5	58.1	64.4	74.5	77.6	76.4	68.2	61.9	44.0	44.5	57.4
1859 ...	32.9	40.1	51.0	53.7	69.3	72.1	78.3	73.4	66.8	52.6	46.6	31.1	55.7
1860 ...	36.9	37.7	46.8	57.9	69.0	71.0	77.3	73.7	65.3	57.8	42.0	33.2	55.7
1861 ...	35.2	40.5	44.8	56.4	61.4	73.7	71.7	74.3	64.8	55.4	43.5	37.4	54.9
1862 ...	37.1	36.5	43.5	54.9	66.0	71.2	78.2	77.6	71.4	57.4	44.8	40.5	56.6
1863 ...	39.5	40.4	42.0	54.0	72.3	69.7	75.7	74.3	63.9	52.9	45.8	39.9	55.7
1864 ...	32.9	38.3	42.7	52.3	63.8	69.6	78.2	75.8	67.8	51.5	47.3	36.9	54.8
1865 ...	29.7	38.6	49.1	57.7	62.6	73.2	73.5	70.6	71.2	53.9	43.2	39.0	55.2
1866 ...	33.0	34.2	43.0	59.9	60.8	71.9	77.2	67.2	65.5	56.6	44.2	31.6	53.8
1867 ...	24.7	40.7	39.1	57.1	59.7	75.5	76.8	73.8	70.6	55.5	45.9	35.5	54.6
1868 ...	29.4	33.9	50.0	54.0	61.5	71.2	79.9	72.0	63.8	54.5	43.6	31.7	53.6
1869 ...	38.3	38.9	40.1	52.5	61.4	68.8	74.2	75.1	66.3	47.3	39.9	37.1	53.3
1870 ...	37.5	35.4	39.6	53.7	66.9	72.1	77.1	75.0	69.5	58.1	45.4	28.3	54.9
1871 ...	37.7	38.7	51.7	60.3	65.6	75.2	75.2	76.5	65.0	52.2	35.8	32.0	55.5
1872 ...	30.5	32.3	37.2	57.5	66.6	72.8	77.6	76.2	66.1	53.2	40.9	26.2	53.1
1873 ...	30.2	34.4	39.8	52.6	65.3	75.0	76.6	72.9	68.5	51.6	43.4	43.4	54.5
1874 ...	39.2	41.3	46.8	52.0	68.4	78.2	77.7	73.2	71.0	57.1	45.8	41.6	57.9
1875 ...	29.2	31.4	45.2	53.6	66.8	74.5	78.9	74.5	66.8	54.2	46.6	48.4	55.8
1876 ...	44.6	40.7	45.9	57.7	68.8	76.0	79.3	77.8	68.2	50.7	43.0	26.2	50.6
1877 ...	33.4	42.5	42.9	58.2	63.8	74.3	78.8	76.1	68.9	60.0	47.4	47.4	57.8
1878 ...	37.4	40.8	52.9	53.6	65.0	71.1	82.9	78.8	65.0	56.7	46.9	31.1	56.8
1879 ...	32.3	37.1	48.0	56.3	69.3	74.7	81.6	73.8	64.9	63.9	48.7	44.6	57.9
1880 ...	50.1	43.6	46.8	58.8	71.6	75.5	76.8	76.6	66.6	55.4	39.8	30.7	57.7
1881 ...	31.6	34.4	40.0	50.8	67.1	71.0	77.5	75.2	73.9	60.9	44.8	41.1	55.7
1882 ...	34.8	42.6	47.4	51.6	59.9	69.0	74.8	71.2	66.1	58.6	43.1	33.3	54.4
1883 ...	30.4	38.7	38.3	55.0	61.1	69.7	73.2	69.8	64.6	57.5	46.6	36.4	53.4
1884 ...	23.3	40.9	42.5	51.6	62.0	71.1	72.2	71.5	69.3	58.1	42.4	33.9	53.2
1885 ...	29.2	26.1	35.0	52.6	62.0	69.0	75.3	71.8	63.6	51.5	41.7	35.8	51.1
1886 ...	27.7	32.3	42.6	55.3	64.5	68.8	72.8	71.8	66.9	53.5	42.5	30.4	52.4
1887 ...	33.0	42.0	42.3	52.5	67.8	71.4	78.0	72.2	65.2	51.6	42.5	35.6	54.5
Mean..	35.1	37.9	45.0	57.5	65.1	72.5	76.9	74.4	67.8	55.7	44.7	36.2	55.7

Rainfall, in inches and hundredths, at Portsmouth, Scioto Co., Ohio, from observations furnished by D. B. Cotton, M. D.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1830 ...	1.10	1.40	6.00	1.10	2.50	3.80	0.30	0.90	2.90	0.10	4.10	0.10	24.30
1831 ...	0.30	1.80	3.90	1.00	3.30	6.60	9.40	4.70	2.70	3.40	0.40	1.90	39.40
1832 ...	3.00	4.00	1.80	5.80	2.20	2.30	4.50	7.30	3.30	3.20	2.00	6.20	45.60
1833 ...	2.65	3.20	2.05	1.40	3.10	7.00	3.10	0.30	3.10	3.10	2.80	3.55	35.35
1834 ...	6.70	1.60	2.60	2.20	1.20	4.10	1.40	1.05	1.40	3.70	4.30	3.20	33.45
1835 ...	2.50	1.50	1.90	3.00	2.90	2.60	2.90	2.60	2.80	3.60	6.10	2.10	34.50
1836 ...	1.30	3.15	4.20	3.10	6.80	2.70	3.10	6.00	3.80	2.00	2.20	2.20	40.55
1837 ...	0.96	3.65	2.50	1.10	4.70	8.60	8.20	3.90	5.90	4.80	1.70	3.28	49.29
1838 ...	1.50	3.20	3.20	4.50	5.10	5.12	5.00	1.80	1.10	3.50	3.10	1.60	38.72
1839 ...	2.20	1.90	2.60	2.22	3.12	3.00	0.60	1.10	4.91	0.30	2.90	0.97	25.82
1840 ...	2.02	2.75	2.34	5.50	6.40	10.66	1.35	3.15	2.20	3.30	0.30	2.12	42.09
1841 ...	5.04	1.70	3.52	5.62	6.30	2.42	4.00	2.70	2.52	5.20	5.50	3.42	47.94
1842 ...	4.30	3.04	2.94	4.20	6.02	8.20	3.14	2.21	0.90	1.20	3.85	2.32	42.32
1843 ...	3.54	1.22	3.47	6.00	4.04	6.38	6.70	2.85	5.07	4.74	5.20	2.37	51.58
1844 ...	2.92	0.20	2.57	1.64	5.21	4.00	4.60	4.00	2.80	3.00	2.60	0.64	34.18
1845 ...	1.94	1.60	2.24	1.30	5.10	5.85	2.92	5.30	3.80	3.00	3.80	3.20	40.05
1846 ...	3.25	1.51	4.25	4.31	5.06	3.81	3.25	5.44	2.00	0.69	6.38	5.44	45.39
1847 ...	2.85	2.62	5.55	1.12	3.12	3.06	4.19	2.06	4.94	6.19	1.50	11.10	48.30
1848 ...	3.91	2.38	2.75	0.25	6.81	3.25	6.94	5.06	0.25	2.50	1.50	5.48	41.14
1849 ...	4.38	3.76	5.38	1.44	2.00	3.50	8.75	2.50	0.50	4.25	1.75	5.05	43.26
1850 ...	8.22	3.56	8.06	3.69	3.81	3.62	4.00	8.00	0.75	2.62	2.75	8.12	57.20
1851 ...	0.50	6.70	1.50	1.69	3.75	2.50	3.00	2.12	[2.75]	1.31	2.15	3.00	[30.97
1852 ...	2.00	4.12	3.75	5.56	2.44	6.19	1.12	2.88	1.88	1.56	2.62	5.50	39.62
1853 ...	1.32	4.08	1.50	5.19	1.00	2.00	1.50	1.88	3.00	5.12	1.75	0.40	28.74
1854 ...	7.25	2.69	4.75	2.00	0.25	1.00	2.00	1.50	0.56	3.56	3.19	2.58	31.33
1855 ...	0.75	0.20	3.00	1.25	2.94	7.31	4.94	7.44	4.56	9.81	2.81	[3.50]	[45.51
1856 ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.80	.....
1857 ...	0.95	0.75	.....	0.15	1.00	2.12	3.62	1.00	0.25	2.00	.....	.....	.....
1858 ...	.....	0.35	0.20	.....	.....	5.75	2.69	2.44	0.44	1.81	1.64	5.75	.....
1859 ...	2.33	7.20	3.09	8.34	1.43	4.21	1.22	6.70	1.29	2.32	2.09	6.15	46.37
1860 ...	3.94	1.05	1.01	4.24	3.59	1.90	3.96	2.57	3.18	1.58	4.64	2.25	33.91
1861 ...	3.10	2.60	1.81	5.35	5.99	2.15	1.40	5.45	3.19	3.40	5.86	1.64	41.94
1862 ...	7.41	4.48	4.98	6.15	1.56	3.34	1.81	2.50	1.16	1.50	2.26	2.80	39.95
1863 ...	6.42	3.48	4.43	2.02	1.37	1.76	4.32	4.15	1.52	3.16	2.14	2.24	37.01
1864 ...	2.32	1.45	2.69	2.26	3.29	2.94	1.00	4.11	2.35	3.05	5.62	4.69	35.77
1865 ...	2.65	3.55	5.90	3.95	10.59	4.30	6.17	2.00	6.03	1.15	1.15	6.53	53.97
1866 ...	4.61	3.02	3.69	2.82	1.33	2.93	4.72	2.82	9.29	3.41	4.82	1.51	44.97
1867 ...	3.23	5.96	7.11	1.37	4.64	1.46	4.34	4.32	0.72	5.57	2.10	4.47	45.29
1868 ...	1.81	0.95	3.83	4.71	6.26	4.40	2.97	4.45	9.00	1.64	1.85	3.20	45.07
1869 ...	2.82	2.52	4.57	4.22	3.86	4.70	4.20	2.21	3.48	2.28	3.82	3.16	41.84
1870 ...	4.92	3.68	3.87	3.48	1.34	3.17	7.54	4.95	0.75	2.99	2.18	2.04	40.91
1871 ...	2.57	3.96	2.50	2.69	1.80	2.59	3.66	2.26	1.32	2.59	2.02	2.70	30.66
1872 ...	0.78	2.25	1.14	8.37	3.08	1.89	6.10	1.81	1.32	1.20	1.18	2.01	31.13
1873 ...	1.60	4.87	3.01	1.97	4.75	3.48	7.12	4.98	2.58	4.95	1.94	4.94	46.19
1874 ...	4.63	3.71	2.62	5.38	1.18	3.46	6.22	1.94	2.50	0.24	3.04	2.80	38.32
1875 ...	2.12	1.52	5.36	1.99	3.50	5.81	8.76	3.28	1.73	2.26	5.06	4.33	45.72
1876 ...	4.25	2.47	4.45	2.53	1.00	3.69	6.75	3.54	5.60	1.82	3.67	1.45	41.22
1877 ...	5.16	0.36	5.16	2.59	1.97	3.60	5.11	1.39	2.20	1.79	2.44	3.24	35.01
1878 ...	2.96	1.36	3.90	1.37	1.96	2.39	1.42	2.92	2.73	2.06	3.16	3.66	29.89
1879 ...	3.19	2.73	3.29	0.42	3.14	4.31	1.25	4.79	2.41	1.49	1.53	7.01	35.56
1880 ...	4.05	5.80	4.56	5.94	2.03	4.65	2.85	5.54	3.99	2.90	3.05	3.62	48.98
1881 ...	4.32	2.41	3.82	3.23	1.76	3.60	3.80	2.06	2.45	4.47	3.70	5.17	40.79
1882 ...	8.82	6.28	4.19	3.09	8.49	6.85	3.44	6.69	3.66	1.72	1.30	1.68	56.21
1883 ...	3.54	8.03	3.40	4.50	3.59	4.15	4.13	0.82	1.46	6.47	3.08	5.36	48.53
1884 ...	5.34	6.11	5.55	3.90	4.90	3.47	2.45	1.35	1.87	1.22	1.46	4.70	42.32
1885 ...	6.41	2.41	1.02	4.04	3.72	2.39	2.12	5.52	2.40	3.70	1.71	1.85	37.29
1886 ...	3.70	1.82	3.88	3.28	5.22	6.75	3.82	3.98	3.99	1.25	5.22	2.42	45.33
1887 ...	2.84	9.28	1.94	6.01	1.76	3.46	4.12	1.75	2.09	0.72	2.47	4.24	40.68
Mean..	3.38	3.05	3.49	3.33	3.56	4.06	3.93	3.39	2.76	2.85	2.93	3.50	40.23

Monthly and annual mean temperatures, in degrees Fahr., at Palermo, Oswego Co., N. Y., from observations furnished by E. B. Bartlett.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1860 ...	25.3	25.0	33.9	41.7	59.8	68.6	62.3	67.6	57.6	50.0	39.6	24.4	46.3
1861 ...	19.8	26.6	28.8	43.8	51.4	65.2	68.6	66.9	59.9	49.2	36.9	30.5	45.6
1862 ...	22.3	23.4	29.7	42.4	59.9	63.1	69.1	69.2	59.0	50.9	37.6	29.1	46.3
1863 ...	29.4	22.9	25.3	43.0	56.9	62.4	71.3	69.4	57.2	50.5	38.1	22.4	45.7
1864 ...	22.2	24.6	28.5	40.6	58.9	65.0	76.6	69.3	57.7	44.2	35.7	25.0	45.7
1865 ...	15.1	20.0	33.5	45.2	54.9	68.1	65.9	66.6	64.7	42.8	36.2	28.0	45.0
1866 ...	18.5	21.5	26.1	46.1	49.7	63.4	71.2	62.1	56.2	48.5	37.1	23.4	43.6
1867 ...	14.6	26.6	26.7	41.0	47.5	68.0	69.3	69.5	59.7	48.2	30.6	19.2	43.9
1868 ...	16.2	14.9	30.5	37.3	54.0	65.7	75.1	69.2	57.7	43.4	34.4	20.0	43.2
1869 ...	24.5	22.2	23.2	40.9	53.8	62.7	63.4	65.7	61.7	43.1	32.2	27.1	43.4
1870 ...	27.1	20.2	25.4	46.9	58.5	71.6	72.8	69.6	61.9	50.0	36.3	24.9	47.1
1871 ...	20.0	22.2	35.9	44.3	55.3	65.7	65.2	68.7	54.6	49.7	29.6	20.9	44.3
1872 ...	19.7	19.4	19.0	41.1	53.6	65.9	71.8	71.2	60.6	45.5	33.3	17.6	43.2
1873 ...	18.4	19.8	25.8	38.2	54.0	67.8	69.6	66.1	58.2	46.3	26.8	27.4	43.2
1874 ...	24.6	20.7	27.5	32.4	54.7	64.5	69.6	64.1	62.9	46.8	34.0	24.8	43.9
1875 ...	16.3	12.7	24.8	37.4	54.2	65.4	67.3	66.4	55.3	43.9	29.6	26.6	41.6
1876 ...	28.3	23.2	24.7	40.1	55.1	66.6	70.4	70.0	58.4	44.7	38.4	17.7	44.8
1877 ...	18.2	27.2	26.6	42.5	54.1	65.8	70.2	71.6	62.1	49.2	37.5	31.0	46.3
1878 ...	22.6	27.6	38.1	50.0	54.2	63.8	74.4	69.4	63.2	48.6	37.9	24.2	47.8
1879 ...	17.7	16.8	27.9	39.2	55.9	61.4	69.7	65.5	56.0	53.9	33.4	22.7	43.3
1880 ...	29.4	24.1	26.4	42.5	60.7	64.8	67.7	65.2	60.6	44.6	28.8	16.8	44.3
1881 ...	12.8	17.5	28.5	38.0	59.2	61.5	67.9	68.2	65.1	46.9	34.3	32.1	44.3
1882 ...	20.3	26.4	29.6	33.6	49.8	62.4	67.5	66.6	58.1	49.0	33.6	23.7	43.4
1883 ...	14.9	19.9	19.4	38.5	51.8	65.2	64.8	63.0	54.5	44.9	36.4	23.6	41.4
1884 ...	14.1	23.8	26.6	38.3	52.4	65.1	62.9	66.1	62.0	47.8	33.6	23.5	43.0
1885 ...	17.7	9.8	17.1	38.0	54.0	61.1	67.5	11.6	56.4	46.1	36.7	25.6	41.0
1886 ...	17.5	19.6	28.2	46.4	52.6	61.7	65.7	65.3	54.9	47.3	34.8	19.3	42.8
1887 ...	17.0	20.9	23.0	38.9	60.9	64.8	72.6	63.5	54.7	41.9	33.1	25.4	43.1
Mean..	20.2	21.7	27.6	41.0	54.9	65.3	69.1	63.5	59.0	47.1	34.7	24.2	44.1

Rainfall, in inches and hundredths, at Palermo, N. Y., from observations furnished by E. B. Bartlett.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1860 ...	2.60	3.40	3.30	2.00	2.50	6.80	2.90	2.60	4.70	4.70	5.20	4.20	44.90
1861 ...	3.20	3.30	4.90	4.20	4.10	3.30	3.80	3.60	4.10	4.60	4.50	4.20	47.80
1862 ...	3.30	3.70	5.40	2.90	3.10	3.00	5.50	2.40	3.50	7.90	3.70	2.60	47.00
1863 ...	3.60	2.70	2.90	6.20	5.10	2.30	4.20	5.30	2.50	3.50	4.30	5.60	48.20
1864 ...	4.60	3.00	2.90	4.90	6.50	0.70	1.10	6.40	2.70	6.00	5.90	5.10	49.40
1865 ...	3.40	2.30	5.10	2.70	3.30	8.80	3.00	1.10	4.20	5.60	3.35	3.10	45.95
1866 ...	1.56	7.20	2.35	2.90	2.70	4.80	2.80	0.41	7.30	4.30	6.60	6.05	48.97
1867 ...	4.70	2.50	2.95	2.70	6.90	1.60	2.40	1.60	2.30	1.00	1.40	3.00	33.05
1868 ...	4.50	2.90	2.60	1.50	2.60	2.80	0.70	2.70	4.10	1.40	6.25	6.80	38.85
1869 ...	1.50	3.90	1.90	1.30	3.10	3.00	4.70	2.60	3.80	5.10	2.00	2.90	35.80
1870 ...	4.30	4.10	3.80	1.10	0.30	0.70	3.70	0.50	3.75	2.20	3.00	3.10	30.55
1871 ...	2.70	1.70	2.61	2.80	0.60	2.10	1.40	5.20	1.20	1.20	3.20	4.20	28.91
1872 ...	1.70	1.30	2.50	1.10	1.50	3.30	3.70	1.10	3.30	6.30	3.30	2.40	31.50
1873 ...	3.10	1.85	6.10	1.03	1.40	0.80	6.10	2.30	2.90	5.70	3.50	4.80	39.58
1874 ...	6.50	3.40	2.40	4.10	1.80	4.80	6.60	0.60	3.20	3.40	3.90	1.60	42.30
1875 ...	0.30	2.41	3.40	1.50	1.30	3.20	1.90	1.60	4.20	3.10	3.60	3.50	30.01
1876 ...	4.10	5.40	3.50	2.60	1.10	2.90	3.60	1.00	4.40	3.60	3.50	4.91	40.61
1877 ...	3.50	0.10	2.70	1.70	0.40	2.50	4.90	2.54	2.60	3.00	3.71	3.30	30.95
1878 ...	3.60	2.30	2.52	3.00	3.30	3.20	2.70	5.50	1.60	5.35	4.05	7.95	44.97
1879 ...	3.10	4.89	1.75	0.26	1.79	3.49	3.10	2.36	1.57	1.15	4.38	3.34	31.18
1880 ...	2.21	2.49	1.82	1.66	2.57	2.12	3.54	3.82	1.04	2.87	3.75	1.88	31.77
1881 ...	2.69	3.34	2.75	0.88	1.48	2.04	2.35	1.99	1.34	3.81	1.82	5.40	29.89
1882 ...	2.95	2.59	4.22	1.67	2.58	2.92	0.64	2.82	1.85	0.30	1.01	3.51	26.97
1883 ...	2.95	3.01	1.27	1.16	5.87	4.21	3.17	1.29	1.83	1.80	3.57	2.63	32.76
1884 ...	0.16	3.60	3.23	0.68	1.28	1.27	1.62	2.19	1.91	2.65	2.18	3.42	24.19
1885 ...	3.41	2.55	0.68	1.00	2.29	2.92	3.85	2.96	3.99	3.12	2.50	3.93	33.22
1886 ...	3.90	2.36	1.68	2.13	1.07	3.44	1.83	2.30	3.70	1.85	4.31	2.97	31.54
1887 ...	5.39	2.03	1.08	1.12	1.87	2.27	2.65	1.91	2.33	1.93	3.25	2.45	28.28
Mean..	3.20	3.01	2.94	2.16	2.58	3.04	3.16	2.52	3.07	3.48	3.70	3.89	36.75

Monthly and annual mean temperature, in degrees Fahr., and rainfall, in inches and hundredths, at Marengo, McHenry Co., Ill., from observations furnished by John W. James and O. P. Rogers.

TEMPERATURE.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1856 ...	11.2	19.0	29.5	52.2	57.0	73.9	75.3	69.0	62.2	51.8	35.0	16.9	46.1
1857 ...	8.2	28.8	29.3	36.4	53.5	67.7	77.6	69.1	64.3	48.9	30.9	32.6	45.6
1858 ...	33.1	18.3	38.7	45.7	55.6	72.9	74.0	72.1	64.3	51.8	33.1	26.9	48.9
1859 ...	24.1	26.2	38.7	39.9	58.9	63.7	73.3	69.5	61.0	46.9	37.6	16.7	46.4
1860 ...	22.6	25.5	38.8	43.5	56.9	64.0	71.0	66.6	57.5	48.5	33.0	20.8	45.7
1861 ...	20.5	27.8	32.7	47.4	51.8	64.7	66.4	68.0	60.6	49.1	32.4	30.1	46.0
1862 ...	18.8	19.6	32.1	41.7	55.4	62.1	71.4	70.5	62.8	50.1	33.5	29.9	45.6
1863 ...	28.2	25.8	31.3	48.2	60.8	65.0	69.3	69.9	60.1	43.0	36.3	27.5	47.1
1864 ...	17.8	26.3	32.3	43.9	60.8	69.7	72.6	71.2	62.2	44.6	34.5	17.6	46.1
1865 ...	17.1	28.4	40.6	45.9	58.4	68.5	65.6	67.8	68.4	47.8	40.3	18.8	47.3
1866 ...	19.5	20.7	28.8	48.7	54.8	66.5	75.1	65.7	57.2	50.8	37.3	21.7	45.6
1867 ...	15.5	25.8	24.5	46.6	49.8	71.4	70.4	73.4	63.4	51.8	38.4	23.6	46.2
1868 ...	13.6	19.6	38.5	41.4	58.3	67.4	80.2	66.5	56.8	41.6	37.7	19.5	45.1
1869 ...	27.2	25.3	27.1	45.4	55.3	64.7	68.4	69.4	60.3	38.6	30.0	24.3	44.7
1870 ...	20.9	23.3	29.3	49.8	63.6	69.8	74.2	68.6	64.6	50.2	37.8	22.5	47.9
1871 ...	22.5	23.4	36.4	48.1	60.0	66.3	70.2	69.4	57.2	50.5	30.4	16.1	45.9
1872 ...	18.2	21.8	23.8	45.7	57.2	68.9	71.6	69.7	60.8	47.3	26.7	11.8	43.6
1873 ...	13.1	17.3	29.7	41.6	54.3	71.5	69.6	70.2	58.5	43.9	27.6	25.8	43.6
1874 ...	20.2	23.2	30.8	35.5	58.6	69.0	73.5	70.3	63.2	48.9	32.3	23.4	45.7
1875 ...	5.5	4.7	25.8	40.8	56.2	64.5	68.6	65.0	56.8	42.6	30.1	30.6	40.9
1876 ...	25.5	24.9	27.8	44.5	58.1	66.2	71.7	70.9	58.0	44.3	32.8	11.1	44.6
1877 ...	12.3	30.3	.....	43.9	57.4	64.3	71.1	68.8	63.3	49.9	33.0	37.7	.....
1878 ...	24.8	30.7	41.7	50.6	53.7	64.0	73.7	70.4	62.4	46.1	30.2	15.4	47.5
1879 ...	12.9	18.7	34.0	44.8	56.9	64.9	75.0	68.3	57.1	56.0	34.4	20.7	45.5
1880 ...	33.2	26.9	32.0	45.7	63.7	68.7	70.3	70.2	58.2	45.9	34.1	15.7	46.2
1881 ...	10.2	17.0	26.9	38.9	64.4	64.3	72.5	72.9	65.2	51.4	33.2	30.5	45.6
1882 ...	20.6	32.4	33.8	43.7	50.9	63.7	65.5	68.6	60.6	53.1	30.6	19.4	45.7
1883 ...	8.2	15.4	26.6	44.9	52.4	65.1	69.5	65.6	56.8	46.1	35.5	23.2	42.4
1884 ...	9.8	20.5	29.2	43.7	57.0	66.1	67.4	65.8	65.2	51.5	32.8	19.4	44.0
1885 ...	8.8	7.7	24.8	42.2	54.4	64.7	71.8	64.1	59.8	44.8	35.8	23.2	41.8
1886 ...	12.4	19.9	30.2	47.4	57.9	65.5	70.9	69.6	60.9	51.6	31.3	15.4	44.4
1887 ...	11.1	21.6	28.8	47.0	62.9	69.0	75.1	68.1	59.3	43.2	32.6	22.2	45.1
Means.	17.7	22.4	31.6	44.6	57.2	66.8	71.6	68.9	60.9	47.9	33.5	22.2	45.4

RAINFALL.

1850 ...	2.59	0.50	2.83	2.81	2.90	7.42	7.15	15.73	2.58	3.30	3.30	1.04	53.05
1851 ...	2.16	3.43	0.55	3.35	15.46	5.52	5.51	9.85	3.40	3.41	1.63	2.63	56.90
1852 ...	3.39	0.84	6.75	5.99	4.75	2.18	3.49	1.01	2.91	4.98	2.43	3.30	42.02
1853 ...	1.25	2.85	2.00	5.68	4.37	4.85	8.10	1.68	6.14	0.50	6.85	1.10	45.37
1854 ...	1.15	1.60	1.85	0.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
1855 ...	.....	.....	.....	.....	1.74	4.60	3.09	1.38	2.31	2.80	1.60	1.95	.....
1856 ...	0.60	3.95	0.50	4.04	3.92	2.54	2.10	2.92	2.61	2.09	2.97	3.18	31.42
1857 ...	1.14	5.29	4.88	2.70	3.45	4.70	2.26	6.53	4.32	2.02	0.44	0.28	38.01
1858 ...	1.95	0.10	2.99	3.40	7.64	8.00	3.71	7.53	5.81	3.43	4.17	1.54	50.27
1859 ...	1.24	2.06	6.06	2.82	2.93	2.08	1.90	0.97	3.95	0.70	4.33	0.75	29.79
1860 ...	1.43	0.90	1.05	2.05	4.58	4.67	3.26	1.59	5.22	1.54	1.69	1.87	29.85
1861 ...	1.20	1.74	2.95	3.95	4.49	2.15	3.64	4.56	6.38	2.61	1.22	1.68	36.57
1862 ...	2.18	6.00	1.53	3.29	1.95	3.54	9.99	4.04	5.90	1.31	0.08	1.30	41.11
1863 ...	3.13	1.04	2.01	1.70	3.46	0.41	2.27	2.52	1.56	3.06	1.85	2.56	25.57
1864 ...	0.45	0.15	1.25	1.63	2.75	1.30	6.37	1.13	1.57	2.28	2.27	2.76	23.91
1865 ...	0.45	6.00	2.62	2.93	0.88	4.39	3.78	9.13	3.59	1.98	0.72	0.74	37.21
1866 ...	0.54	0.70	1.72	2.58	2.61	3.98	5.10	8.09	7.91	2.20	0.59	3.84	39.86
1867 ...	2.20	0.62	1.00	1.80	4.98	4.72	4.72	3.41	1.48	0.29	1.68	1.03	27.93
1868 ...	1.57	0.75	4.40	6.20	4.93	9.17	1.15	4.79	5.65	1.20	3.93	1.04	44.78
1869 ...	2.11	2.68	1.76	2.43	4.80	9.68	5.39	4.96	2.59	0.88	2.50	2.71	42.49
1870 ...	2.28	0.59	4.43	1.51	0.54	0.99	4.66	3.79	5.36	3.14	0.69	1.50	29.48
1871 ...	2.82	1.30	2.23	2.05	2.32	5.17	1.04	3.07	0.68	2.97	2.25	1.93	27.83
1872 ...	0.45	0.42	2.78	3.47	3.41	3.18	4.38	3.31	8.89	0.62	1.47	0.93	33.31
1873 ...	2.14	0.33	1.56	2.40	5.23	2.59	2.61	1.98	2.34	2.21	1.55	3.42	28.36
1874 ...	3.76	0.95	1.93	2.02	2.04	2.96	1.09	2.75	2.58	2.31	1.48	0.48	24.35
1875 ...	1.38	1.95	1.01	2.33	3.28	5.26	4.24	2.14	7.29	2.76	0.72	2.32	34.68
1876 ...	5.96	5.26	7.23	5.97	5.64	7.14	5.13	4.79	6.40	5.24	8.38	5.67	72.81
1877 ...	1.72	0.03	5.53	2.81	0.93	4.83	1.96	3.60	0.21	6.57	2.90	3.38	34.47
1878 ...	0.85	1.33	2.72	2.89	4.25	2.46	4.73	3.52	1.46	4.71	1.05	2.46	32.44
1879 ...	0.85	1.54	1.15	2.30	4.97	4.81	5.68	1.96	1.20	1.38	5.30	1.47	32.61
1880 ...	4.14	1.62	1.40	3.10	2.68	5.28	2.68	4.24	4.02	2.37	1.01	0.75	33.29
1881 ...	1.54	5.28	6.48	0.98	3.10	5.62	5.88	1.01	5.47	6.81	2.36	2.69	47.22
1882 ...	1.57	2.15	4.58	3.29	3.59	4.42	3.63	2.08	2.36	4.17	1.52	2.00	35.36
1883 ...	2.18	4.61	0.89	2.00	6.18	3.92	2.94	1.17	2.04	4.28	4.03	1.67	35.91
1884 ...	0.80	2.20	1.51	2.85	2.56	4.22	4.19	3.36	4.34	3.85	1.79	3.28	34.95
1885 ...	2.32	1.92	0.29	3.97	1.72	5.80	2.07	6.80	3.86	2.57	2.09	2.37	35.78
1886 ...	3.60	1.61	3.68	3.76	3.13	1.89	0.81	5.85	2.25	2.55	0.98	1.13	31.24
1887 ...	3.59	4.82	1.01	1.55	0.95	1.23	2.70	4.85	4.61	2.75	1.87	3.31	33.24
Mean..	1.96	2.14	2.68	2.95	3.76	4.26	3.88	4.11	3.84	2.75	2.32	2.08	36.73

Monthly and annual mean temperatures, in degrees Fahr., at Hanover, Grafton Co., N. H., from observations made at Dartmouth College.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1834 ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32.0	18.5	.....
1835 ...	17.6	16.2	27.5	37.6	50.3	61.5	67.7	62.6	53.2	48.9	31.0	12.9	40.6
1836 ...	19.3	10.9	23.0	36.9	53.7	61.2	68.5	61.0	57.0	38.6	30.9	20.2	40.1
1837 ...	10.6	18.5	26.2	38.4	49.6	62.0	63.5	62.9	54.9	41.7	32.3	21.5	40.2
1838 ...	26.5	12.3	32.8	34.2	52.1	65.6	69.5	64.4	57.9	42.1	29.3	16.0	41.9
1839 ...	16.6	24.7	30.2	43.9	55.5	57.9	67.7	64.4	57.1	42.3	31.8	23.4	43.0
1840 ...	8.8	27.2	29.6	45.0	56.8	62.2	68.6	68.3	55.6	44.6	33.0	20.0	43.3
1841 ...	24.6	18.8	27.7	39.0	52.5	66.0	66.5	67.4	62.3	42.0	33.5	25.3	43.8
1842 ...	19.1	27.1	34.9	42.6	51.1	59.8	66.4	64.8	52.9	42.6	31.7	19.6	42.7
1843 ...	25.7	11.6	23.9	42.3	53.5	61.9	64.5	69.5	57.9	42.0	30.6	24.6	42.3
1844 ...	7.9	19.6	31.1	46.3	55.8	62.8	62.3	64.8	56.6	44.1	32.8	22.9	42.2
1845 ...	19.3	22.0	31.7	39.5	51.3	61.9	66.8	66.4	53.9	46.1	36.9	14.0	42.5
1846 ...	18.1	13.1	30.5	43.4	53.2	62.7	67.1	70.5	63.4	44.3	39.1	33.0	44.0

Monthly and annual mean temperatures, &c.—Continued.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1847 ...	18.4	14.8	25.1	36.7	55.8	63.5	68.3	66.8	57.3	43.5	38.8	31.2	43.4
1848 ...	20.2	17.7	29.7	43.4	59.1	64.4	66.8	66.1	53.9	44.7	32.0	28.6	43.9
1849 ...	13.1	11.8	30.8	36.7	51.4	63.5	66.7	64.6	55.4	43.4	41.6	19.4	41.5
1850 ...	20.9	21.6	27.7	37.6	49.2	64.9	69.5	65.3	57.0	45.6	35.3	16.3	40.9
1851 ...	17.7	21.4	32.5	41.1	53.2	60.6	66.9	64.9	56.7	44.5	28.1	15.1	41.9
1852 ...	7.5	19.7	28.7	39.7	55.3	64.4	67.8	63.0	57.2	45.3	35.0	27.2	42.6
1853 ...	19.2	20.8	31.4	41.8	55.2	65.0	65.6	66.1	56.9	.....	.....	.....	.....
1856 ...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.9	.....
1857 ...	.....	.....	26.9	38.5	52.7	60.8	69.8	.....	56.3	44.8	38.9	.....	.....
1858 ...	21.1	15.0	26.9	40.5	51.3	64.9	65.3	.....	57.9	46.8	29.0	18.7	.....
1859 ...	20.2	19.8	31.7	39.3	56.4	61.1	65.9	.....	55.9	40.9	29.6	.....	.....
1860 ...	23.5	15.3	33.5	40.4	56.1	63.4	65.3	65.8	54.9	45.7	39.4	16.3	43.3
1861 ...	17.7	23.3	28.5	42.4	50.9	64.5	69.0	65.4	57.4	47.4	33.6	23.3	43.6
1862 ...	16.6	17.1	28.8	39.6	56.1	62.0	66.5	66.6	59.6	47.5	35.8	.....	.....
1863 ...	.....	.....	22.2	42.3	.....	61.9	69.9	67.1	56.1	47.8	38.9	21.5	.....
1864 ...	20.3	23.5	30.2	41.6	58.0	65.1	70.6	.....	55.2	50.1	36.3	23.8	.....
1865 ...	18.2	19.5	38.8	45.9	57.4	70.2	66.6	.....	61.9	43.4	37.0	.....	.....
1866 ...	.....	.....	27.4	45.8	52.7	65.9	73.4	.....	56.8	40.2	36.2	22.1	.....
1867 ...	11.3	26.3	30.9	40.3	51.9	68.0	56.5	.....	56.9	45.0	31.6	16.1	.....
1868 ...	14.9	11.8	31.0	38.5	55.1	65.6	77.4	.....	54.2	42.2	31.4	18.3	.....
1869 ...	17.3	21.1	20.7	38.3	54.2	62.5	66.9	.....	60.9	43.9	31.7	23.4	.....
1870 ...	2.55	19.2	25.5	44.7	55.7	70.7	72.4	69.0	58.9	47.7	35.5	23.9	45.7
1871 ...	16.0	20.3	35.6	43.7	55.1	64.2	66.8	.....	52.5	47.4	28.3	18.2	.....
Mean..	17.9	18.7	29.2	40.8	53.9	63.6	67.4	65.7	56.3	44.6	33.8	20.6	42.7

Rainfall, in inches and hundredths, at Philadelphia, Pa., from observations furnished by Dr. Swift, Dr. Conrad H. Eachers, Prof. J. A. Kirkpatrick, J. M. Green, J. M. Foltz, W. Johnson, D. Harlau, Dr. A. D. Bache, S. Maulsby, and the Signal Service.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1825 ...	0.84	3.26	4.63	0.83	1.72	3.59	2.06	3.70	2.61	1.25	1.36	3.72	29.57
1826 ...	1.11	2.13	5.80	3.87	0.19	4.65	3.68	2.75	2.00	5.83	1.85	1.28	35.14
1827 ...	2.86	3.55	1.23	2.83	2.50	2.09	2.97	5.75	0.79	5.91	4.87	3.26	38.50
1828 ...	2.05	2.75	3.35	3.82	3.49	2.69	5.33	1.51	4.62	1.39	6.71	0.26	37.97
1829 ...	5.37	3.75	2.87	4.99	2.68	3.44	4.35	4.61	2.01	2.30	3.97	1.51	41.85
1830 ...	1.63	2.06	4.12	1.81	3.75	5.99	4.07	3.87	2.93	4.31	5.35	5.18	45.07
1831 ...	6.02	2.44	3.17	5.20	1.07	3.56	4.17	5.39	5.33	4.51	1.88	1.20	43.94
1832 ...	4.58	2.66	1.90	2.98	5.40	1.55	2.62	5.09	1.40	3.41	2.59	5.09	39.87
1833 ...	3.97	1.24	2.22	0.70	5.88	5.28	4.15	3.39	3.82	10.05	2.18	5.67	48.55
1834 ...	2.49	2.22	2.02	2.83	3.52	3.99	4.35	0.62	3.57	3.29	3.01	2.33	34.24
1835 ...	2.75	1.81	3.83	4.33	1.99	6.27	6.55	2.05	2.63	1.22	3.19	2.68	39.30
1836 ...	7.62	2.99	1.75	3.47	2.28	7.31	2.91	1.97	1.82	3.59	3.34	3.61	42.66
1837 ...	2.50	3.58	3.76	2.83	4.86	2.83	5.89	4.06	2.28	0.66	3.23	2.56	39.04
1838 ...	2.20	2.19	3.17	3.59	3.58	6.60	2.38	2.78	9.52	4.90	3.35	1.04	45.30
1839 ...	5.04	3.42	1.50	1.51	6.07	3.92	2.52	4.64	2.92	2.83	3.10	6.26	43.73
1840 ...	1.84	3.01	2.63	6.83	2.69	5.95	4.54	5.55	2.50	5.73	2.49	3.65	47.41
1841 ...	7.84	1.39	5.82	6.46	3.27	3.11	3.28	9.10	1.90	3.20	4.22	5.92	55.51
1842 ...	1.36	4.27	2.84	5.31	5.87	3.19	11.81	3.79	1.27	1.72	3.49	3.66	48.58
1843 ...	1.44	2.54	4.42	4.72	2.05	1.69	4.54	9.26	4.86	3.22	4.18	4.04	46.96
1844 ...	4.05	1.45	4.43	1.35	3.09	3.35	5.28	2.40	4.03	5.02	2.95	2.75	40.15
1845 ...	3.76	4.74	2.41	2.58	1.60	3.73	2.76	7.30	2.16	2.53	2.50	3.90	40.03
1846 ...	4.03	3.33	4.60	2.11	3.44	3.30	4.60	4.27	0.25	2.44	7.97	3.44	44.38
1847 ...	4.73	4.60	4.70	0.59	1.57	3.30	2.77	3.18	8.07	3.06	2.84	5.78	45.21
1848 ...	2.03	1.44	2.76	1.54	4.90	4.43	3.28	1.71	1.80	3.75	2.34	5.01	34.99
1849 ...	0.73	2.61	5.47	1.75	4.00	2.20	2.93	6.98	1.40	5.59	2.60	5.84	42.10
1850 ...	4.77	2.87	4.75	2.67	0.50	2.03	5.97	8.33	7.73	1.09	3.32	4.51	54.54
1851 ...	1.23	3.11	3.48	4.57	4.82	3.44	2.52	2.55	1.13	3.02	3.36	2.27	35.50
1852 ...	2.01	2.71	4.27	6.44	3.03	4.03	4.05	4.40	1.29	2.27	6.06	5.17	45.74
1853 ...	1.84	4.44	2.46	3.38	5.17	1.05	8.63	3.08	4.46	3.47	2.32	2.16	42.46
1854 ...	2.32	4.20	1.63	8.14	7.30	3.44	3.84	0.92	4.88	1.92	3.46	3.18	45.23
1855 ...	2.60	2.48	1.98	2.15	3.03	8.01	6.59	3.24	4.13	3.42	2.02	5.01	44.66
1856 ...	3.37	1.13	2.04	3.15	2.33	1.68	1.13	5.18	5.70	1.30	2.89	3.62	33.52
1857 ...	2.99	2.06	1.74	7.36	6.97	8.21	3.49	7.77	1.17	3.97	1.44	5.85	53.02
1858 ...	2.64	1.95	0.86	4.79	5.25	4.36	1.23	4.48	1.29	1.79	4.86	5.46	38.96
1859 ...	5.52	3.53	6.60	5.18	1.73	5.51	3.96	4.18	7.54	3.60	3.40	3.73	54.48
1860 ...	3.18	2.61	1.76	3.73	3.80	3.30	1.17	8.28	5.30	5.59	6.53	3.65	48.90
1861 ...	3.81	2.06	3.55	3.73	6.47	4.34	2.91	3.10	4.39	3.80	3.30	1.76	43.22
1862 ...	4.50	3.89	3.25	4.48	2.19	5.55	4.42	2.07	4.29	3.63	3.83	2.48	44.58
1863 ...	4.70	3.82	6.38	7.29	4.79	4.05	5.69	1.44	0.98	2.66	2.96	4.87	49.63
1864 ...	1.86	0.82	4.34	4.02	8.80	2.12	2.97	1.65	6.23	1.57	3.70	4.16	42.24
1865 ...	2.80	4.01	3.70	2.62	6.17	3.66	2.55	3.37	7.27	3.20	4.13	5.64	49.12
1866 ...	2.89	6.64	2.04	2.92	4.63	3.39	2.51	2.57	7.46	3.54	1.47	3.52	43.58
1867 ...	1.93	4.82	5.67	1.36	7.07	10.95	3.03	10.84	1.85	4.02	1.93	1.82	61.29
1868 ...	2.26	2.59	3.80	5.35	7.43	2.74	2.64	3.07	7.01	3.35	3.23	3.48	46.94
1869 ...	3.37	4.12	5.36	2.26	3.71	5.21	2.30	0.70	3.10	4.38	4.35	4.35	43.21
1870 ...	4.01	2.56	4.52	5.41	5.24	2.54	3.50	5.98	1.60	4.11	1.97	2.13	43.57
1871 ...	2.87	2.48	5.77	1.98	2.92	4.51	6.17	5.58	0.65	3.89	4.09	1.57	42.48
1872 ...	1.49	1.13	3.67	2.60	3.15	4.29	9.20	7.81	3.66	5.20	3.43	2.74	48.36
1873 ...	5.84	4.75	2.05	3.51	5.83	0.90	5.00	11.49	3.63	5.80	5.10	1.38	55.28
1874 ...	4.58	2.46	2.16	9.76	2.75	2.96	2.25	5.65	6.01	2.87	2.32	2.48	46.25
1875 ...	2.83	3.20	3.10	2.83	1.36	4.13	3.63	6.42	2.53	1.42	5.40	3.37	40.22
1876 ...	1.52	5.03	6.71	2.16	4.45	2.29	5.71	0.98	8.77	1.06	7.31	1.40	47.39
1877 ...	2.62	0.84	3.40	2.66	1.10	5.22	5.53	0.66	2.74	6.52	5.14	0.83	37.26
1878 ...	3.94	1.64	2.89	2.55	3.29	3.66	4.35	3.83	0.96	2.04	2.19	3.19	34.53
1879 ...	2.73	1.19	2.28	4.21	1.22	6.77	3.62	7.13	1.12	0.41	1.38	4.69	36.75
1880 ...	1.51	2.43	3.53	2.43	0.54	1.67	7.74	5.09	1.10	1.74	1.75	4.05	33.58
1881 ...	3.66	4.76	3.83	0.61	2.71	3.87	0.96	1.18	0.94	3.04	2.02	2.63	30.21
1882 ...	4.57	4.22	3.57	2.12	5.06	1.90	1.37	6.40	12.09	1.32	0.99	1.97	45.58
1883 ...	4.13	5.04	2.02	2.44	1.91	5.91	1.78	3.40	4.24	4.20	1.34	2.76	39.17
1884 ...	5.46	5.70	4.70	1.63	3.39	3.00	3.83	4.30	0.20	1.54	2.31	3.28	39.34
1885 ...	2.92	2.79	0.69	2.54	3.76	0.74	2.39	6.80	1.17	3.33	3.35	2.87	33.35
1886 ...	3.69	4.62	3.17	2.70	4.50	2.86	4.23	1.38	1.20	1.89	3.91	3.09	37.24
1887 ...	3.23	4.43	2.39	2.00	0.62	6.81	7.14	2.31	4.92	1.68	1.58	5.06	42.17
Mean..	3.25	3.06	3.42	3.47	3.75	3.95	4.03	4.44	3.51	3.26	3.32	3.43	42.91

Table of miscellaneous meteorological data for February, 1888—Signal Service observations.

Stations and districts.	Elevation above sea-level, feet.	Atmospheric pressure, in inches and hundredths. Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes. Highest barometer.	Date.	Lowest barometer.	Date.	Monthly range of barometer.	Temperature of the air, in degrees Fahrenheit. Monthly mean.	Departure from normal.	Extremes. Max.	Date.	Mean max.	Min.	Date.	Mean min.	Monthly range.	Daily ranges. Greatest.	Date.	Least.	Date.	Mean relative humidity, per cent.	Mean temperature of dew-point, degrees Fahrenheit.	Precipitation, in inches.	Departure from normal precipitation, in inches.	Winds. Total movement, miles.	Prevailing direction.	Maximum velocity. Miles p. h.	Direction.	Date.	No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
New England.										27.0	−0.8														3.16	−1.18									
Eastport	53	29.96	+.02	30.02	30.52	10	29.36	8	1.16	22.6	+0.6	45.8	21	30.4	−8.3	10	14.4	54.1	30.0	15	7.8	14	74.3	15.2	4.81	+0.77	8,625	nw.	48	se.	26	15	9	10	10
Portland	99	29.93	+.01	30.04	30.44	4	29.49	8	0.95	23.2	−2.8	43.9	21	31.2	−7.0	10	13.4	50.9	37.2	15	8.5	26	74.3	15.5	5.40	+1.85	4,249	nw.	28	nw.	15	11	9	13	7
Manchester	247	29.79	...	30.07	30.46	16	29.55	8	0.91	23.6	...	54.5	14	34.2	−11.0	10	12.0	65.5	46.0	15	11.2	22	67.4	13.3	3.76	...	4,624	nw.	34	nw.	15	11	8	11	10
Northfield	871	29.08	...	30.09	30.55	16	29.53	8	1.02	16.0	...	45.5	14	27.1	−23.3	10	3.8	68.8	38.2	13	12.3	20	71.4	7.8	2.73	...	6,371	s.	48	s.	25	14	10	13	6
Boston	125	29.93	.00	30.07	30.47	15	29.52	8	0.95	28.4	−0.4	56.0	14	37.1	−4.0	16	19.5	60.0	44.0	15	9.0	19	71.0	19.6	2.36	−1.48	7,520	w.	42	nw.	15	10	10	9	10
Edgartown	...	...	...	...	...	...	...	...	...	29.6	...	45.3	21	36.2	−0.2	16	23.1	45.5	26.4	15	2.7	12	...	...	1.64	...	...	nw.	...	...	...	10	...	...	...
Nantucket	14	30.05	...	30.06	30.42	16	29.54	8	0.88	30.8	...	51.0	21	38.4	−1.0	16	23.8	52.0	33.5	15	4.7	12	82.6	25.8	1.50	...	7,422	nw.	45	se.	25	13	4	17	8
Wood's Holl	22	30.05	...	30.07	30.46	16	29.54	8	0.92	28.2	...	48.2	21	36.1	−0.5	16	20.5	48.7	34.5	15	6.2	12	92.7	26.3	1.79	...	*7,753	nw.	42	sw.	21	8	8	11	10
Vineyard Haven	...	...	...	...	...	...	...	...	...	30.1	...	50.7	7	41.7	−3.0	16	18.5	53.7	36.6	10	6.7	18	...	...	3.30	...	...	sw.	...	...	...	12	...	...	...
Block Island	26	30.04	−.02	30.06	30.48	16	29.54	8	0.94	29.7	−1.3	48.8	20	36.1	0.9	16	23.1	47.9	34.3	15	5.0	12	84.7	25.3	1.14	−3.35	11,513	nw.	58	e.	25	10	7	11	11
Narragansett Pier	...	...	...	...	...	...	...	...	...	29.6	...	50.0	21	38.2	−1.0	16	20.9	51.0	28.0	17	10.0	18	...	...	2.92	−2.78	...	nw.	...	...	...	10	...	...	...
New Haven	107	29.96	−.02	30.08	30.60	16	29.54	8	1.06	27.8	−1.2	48.7	14	36.3	−1.5	10	19.3	50.2	36.5	15	8.5	28	74.4	20.2	3.16	−1.33	5,894	n.	48	e.	25	10	9	12	8
New London	47	30.01	−.05	30.06	30.50	16	29.54	8	0.96	30.2	+0.2	50.0	21	38.2	−0.6	16	22.1	50.6	33.5	15	9.0	23	80.7	24.5	2.33	−1.95	5,215	nw.	38	se.	25	8	5	12	12
Mid. Atlantic States.										34.5	−1.0														3.09	−0.35									
Albany	85	30.01	−.01	30.11	30.63	15	29.60	25	1.03	23.3	−3.7	47.6	21	32.1	−10.0	10	12.5	57.6	43.5	15	8.5	25	75.6	16.3	2.07	−0.57	4,223	nw.	36	se.	25	11	11	12	6
New York City	185	29.87	−.04	30.08	30.60	16	29.49	25	1.11	31.6	+0.6	54.8	20	39.7	3.0	16	23.8	51.8	33.9	15	8.0	10	76.8	24.7	4.03	+0.25	7,526	w.	38	w.	15	11	8	15	6
Philadelphia	117	29.99	−.01	30.12	30.68	15	29.49	25	1.19	34.1	+0.1	58.5	20	41.7	2.5	16	26.1	56.0	31.5	15	6.6	12	70.0	24.5	2.57	−0.78	7,106	nw.	36	nw.	25	13	7	16	6
Atlantic City	34	30.07	−.01	30.10	30.65	16	29.51	25	1.14	33.2	−0.8	55.2	26	41.2	2.7	16	25.5	52.5	28.0	15	5.6	13	79.7	27.2	2.81	−0.70	6,567	nw.	46	nw.	15	11	8	14	7
Baltimore	45	30.00	−.04	30.10	30.67	16	29.53	25	1.14	35.5	−1.5	59.9	20	43.1	11.1	16	28.3	48.8	29.7	15	2.4	12	67.8	24.8	2.83	−0.74	3,388	nw.	24	nw.	15	12	12	7	10
Washington City	106	29.99	−.05	30.11	30.70	15	29.55	25	1.15	35.7	−0.3	61.0	20	44.6	12.6	16	27.8	48.4	31.3	14	2.1	12	75.5	27.8	3.19	−0.12	3,539	nw.	24	nw.	27	13	11	9	9
Cape Henry	...	...	...	...	...	...	...	...	...	40.2	...	66.6	25	46.3	18.8	28	34.2	47.8	28.9	17	6.5	10	...	...	4.31	+0.83	...	nw.	...	...	...	13	...	...	...
Lynchburg	652	29.37	−.06	30.08	30.64	16	29.53	25	1.11	40.5	−0.5	66.0	18	49.8	11.3	28	31.3	54.7	38.7	14	5.5	4	70.3	29.4	3.59	+0.12	2,356	ne.	20	nw.	28	12	12	10	7
Norfolk	69	30.03	−.09	30.10	30.64	16	29.55	25	1.09	41.9	−2.1	68.7	25	52.0	17.2	28	33.8	51.5	34.8	17	6.0	12	82.4	36.5	2.41	−1.42	6,015	n.	37	w.	27	16	6	17	6
S. Atlantic States.										52.8	−0.1														4.48	+0.92									
Charlotte	808	29.24	−.04	30.10	30.62	16	29.65	25	0.97	46.1	+0.1	70.0	18	55.6	15.5	28	37.5	54.5	32.6	17	7.0	5	73.3	36.7	4.26	−0.19	3,830	sw.	28	s.	27	10	10	13	6
Kitty Hawk	...	...	...	...	...	...	...	...	...	46.1	...	72.1	25	54.7	22.5	28	37.5	49.6	30.9	29	7.2	11	...	...	4.54	+0.50	...	ne.	...	...	...	10	...	...	...
Raleigh	375	29.70	...	30.10	30.66	16	29.62	25	1.04	44.0	...	67.8	18	53.6	15.0	28	35.8	52.8	37.2	29	5.0	12	80.4	37.9	3.86	...	4,039	sw.	33	nw.	27	12	10	12	7
Southport	...	...	...	...	...	...	...	...	...	49.5	...	63.5	4	56.5	24.0	28	42.6	39.5	25.7	16	5.0	24	...	...	6.25	+3.47	...	sw.	...	...	...	9	...	...	...
Wash Woods †	...	...	...	...	...	...	...	...	...	44.1	...	69.0	25	52.3	18.6	28	35.9	50.4	33.8	17	4.6	1	...	...	3.09	−0.88	...	ne.	...	...	...	10	...	...	...
Wilmington	52	30.04	−.06	30.10	30.63	16	29.65	8	0.98	49.6	−1.4	72.0	18	60.1	24.6	28	41.1	47.4	33.3	17	5.1	21	80.0	43.1	6.22	+3.01	4,846	ne.	26	nw.	27	12	6	13	10
Charleston	52	30.05	−.05	30.10	30.57	16	29.73	25	0.84	54.0	0.0	71.8	18	62.5	27.5	29	47.2	44.3	34.5	29	7.2	22	81.4	47.7	3.64	+0.12	5,288	sw.	26	ne.	16	12	9	12	8
Columbia	...	...	...	...	...	...	...	...	...	50.6	...	70.0	20	58.6	22.0	28	42.1	48.0	34.7	29	5.0	21	77.9	43.2	4.25	...	...	...	...	...	...	11	10	11	8
Augusta	183	29.93	−.06	30.13	30.57	16	29.74	25	0.83	51.4	−0.6	73.7	18	61.5	22.0	28	42.7	51.7	36.6	29	6.5	21	77.4	43.5	4.54	+0.80	2,676	sw.	22	w.	27	11	12	9	8
Savannah	87	30.02	−.06	30.10	30.52	16	29.75	25	0.77	55.2	+0.2	72.0	25	64.5	27.0	28	48.4	45.0	32.7	29	8.5	22	79.6	48.0	3.42	+0.30	4,550	w.	24	n.	27	11	12	8	9
Jacksonville	43	30.05	−.07	30.10	30.49	28	29.82	24	0.67	60.2	+1.2	81.7	23	69.6	32.5	29	52.4	49.2	32.6	29	5.6	21	81.6	54.1	4.38	+1.18	4,618	sw.	33	sw.	27	13	9	13	7
Florida Peninsula.										67.1	+1.6														2.14	+1.10									
Titusville	12	30.11	...	30.12	30.45	28	29.88	25	0.57	63.7	...	81.0	11	70.8	37.9	28	56.3	43.1	22.0	29	7.7	26	83.3	58.1	7.11	...	5,279	nw.	42	nw.	11	12	9	12	8
Cedar Keys	22	30.08	−.05	30.10	30.46	28	29.87	24	0.59	61.7	+1.7	73.0	23	68.0	32.8	28	55.9	40.2	25.8	29	4.3	10	82.1	55.6	3.78	+0.88	6,562	s.	32	w.	27	11	9	11	9
Key West	22	30.08	−.03	30.10	30.34	28	29.91	25	0.43	72.4	+1.4	80.5	22	76.3	58.8	28	68.2	21.7	14.2	26	4.5	27	78.8	65.3	0.51	+1.31	7,375	se.	32	nw.	5	5	3	22	4
Jupiter	28	30.07	...	30.10	30.38	29	29.86	25	0.52	68.4	...	84.7	12	76.2	47.0	28	61.6	37.7	20.9	5	7.3	20	78.4	61.0	3.27	...	6,660	s.	32	ne.	16	11	4	21	4
Eastern Gulf States.										55.0	+1.5														7.82	+3.11									
Atlanta	1,129	28.90	−.06	30.11	30.54	16	29.66	24	0.88	49.0	+2.0	68.0	18	56.3	13.0	28	41.5	55.0	33.0	28	4.0	23	76.0	40.8	5.91	+0.87	6,459	w.	36	sw.	27	12	11	12	6
Pensacola	30	30.03	−.10	30.05	30.47	28	29.75	24	0.72	58.9	+2.9	70.0	20	64.7	32.0	28	53.0	38.0	24.7	13	2.8	19	81.6	52.7	6.86	+2.76	4,734	se.	30	nw.	27	13	10	13	6
Mobile	35	30.04	−.07	30.08	30.50	28	29.75	24	0.75	56.3	+1.3	75.3	1	64.2	30.0	28	49.3	45.3	31.0	29	5.0	23	82.9	50.5	10.33	+5.87	4,701	sw.	28	nw.	27	13	9	14	6
Montgomery	217	29.85	−.07	30.09	30.50	28	29.67	24	0.83	54.5	+2.5	69.8	24	61.8	24.8	28	46.5	44.9	33.8	29	5.3	20	71.8	44.5	7.67	+2.25	3,785	e.	25	w.	27	13	12	13	4
Vicksburg	222	29.84	−.07	30.08	30.56	15	29.67	24	0.89	52.7	−0.3	74.0	19	61.5	28.0	28	45.3	46.0	31.6	28	7.0	5	78.4	45.3	4.96	−0.18	4,356	s.	36	w.	26	13	16	7	6
University	...	...	...	...	...	...	...	...	...	46.5	...	67.8	19	54.4	20.9	28	38.1	46.9	30.8	13	4.9	10	76.8	38.9	2.87	...	...	...	...	...	...	11	12	8	9
New Orleans	52	30.00	−.07	30.05	30.44	28	29.70	10	0.74	58.6	+0.6	78.7	14	65.9	35.0	28	52.1	43.7	31.3	14	5.3	21	80.1	51.8	11.21	+7.11	5,031	n.	26	nw.	27	13	5	18	6
Auburn	...	...	...	...	...	...	...	...	...	52.9	...	67.0	11	60.0	21.0	28	45.0	46.0	25.0	28	5.0	23	...	...	6.34	...	...	w.	...	...	...	16	...	...	...
Western Gulf States.										52.8	+1.6														3.52	−0.66									
Shreveport	249	29.83	−.05	30.07	30.57	15	29.72	9	0.85	51.6	+0.6	74.8	9	61.0	32.5	27	44.5	42.3	32.1	28	5.2	4	82.6	45.9	2.01	−2.93	4,567	s.	24	w.	27	14	12	10	7
Fort Smith	470	29.58	−.04	30.09	30.61	15	29.65	24	0.96	44.5	+2.5	69.8	13	53.7	16.5	27	36.5	53.3	36.3	13	6.1	2	68.7	33.7	1.77	−3.19	3,784	e.	24	w.	27	11	8	15	6
Little Rock	309	29.75	−.05	30.08	30.62	15	29.60	24	1.02	45.9	−0.1	75.0	19	55.1	18.0	27	37.3	57.0	33.0	28	6.0	5	70.1	37.3	2.49	−4.56	4,803	ne.	28	nw.	27	8	17	6	5
Corpus Christi	18	30.03	−.04	30.05	30.49	16	29.78	10	0.71	60.3	+3.3	71.8	24	65.3	43.0	16	54.4	28.8	22.5	24	5.0	14	86.0	55.8	3.50	...	7,344	n.	34	n.	20	6	9	13	7
Galveston	40	30.02	−.00	30.05	30.47	16	29.74	10	0.73	58.8	+1.8	72.0	8	63.1	40.0	12	54.0	32.0	19.0	12	4.2	1	82.3	52.7	7.54	+4.78	6,803	s.	30	n.	4	12	7	14	8
Palestine	533	29.50	−.07	30.07	30.55	16	29.70	10	0.79	52.3	+2.3	75.0	19	60.3	33.3	12	44.8	41.7	31.0	28	7.5	2	74.3	43.2	4.74	+1.24	6,893	ne.	32	s.	29	11	11	10	8
San Antonio	781	29.24	−.05	30.07	30.57	15	29.73	10	0.84	56.5	+0.5	78.2	19	67.3	38.4	12	48.7	39.8	33.6	12	4.5	22	73.5	47.0	2.56	+0.71	6,046	ne.	36	se.	28	10	8	14	7
Rio Grande Valley.										64.4	+2.0														0.62	−0.78									
Rio Grande City	230	29.84	−.02	30.09	30.57	16	29.80	10	0.77	63.6	+0.6	85.0	4	75.2	43.0	12	54.5	42.0	34.0	12	7.9	16	76.6	54.8	0.16	−0.93	4,268	...	...	...	...	...	...	...	...
Brownsville	57	29.98	−.04	30.04	30.50	16	29.74	10	0.76	65.3	+3.3	83.9	11	73.4	45.9	16	58.2	38.0	23.2	11	5.9	16	83.9	59.8	1.09	−0.63	5,949	s.	36	s.	29	4	10	11	8
Ohio Val. & Tenn.										38.6	+0.1														2.60	−1.90									
Chattanooga	783	29.27	−.05	30.12	30.59	16	29.54	24	1.05	46.8	+1.8	68.1	18	56.1	10.1	28	38.8	58.0	36.0	29	5.0	6	74.9	38.4	4.92	−0.43	4,354	ne.	31	nw.	26	12	14	10	5
Knoxville	980	29.05	−.06	30.12	30.61	15	29.59	24	1.02	45.3	+2.3	67.0	18	54.4	9.1	28	37.4	57.9	34.3	29	6.0	6	70.9	35.4	3.75	−1.22	4,410	w.	30	sw.	24	13	14	9	6
Memphis	320	29.73	−.06	30.08	30.60	15	29.50	24	1.10	44.0	+1.0	71.0	19	51.7	21.0	28	37.1	50.0	31.0	13	2.0	11	73.5	35.1	2.49	−3.26	4,835	nw.	30	w.	27	11	13	10	6
Nashville	549	29.50	−.04	30.09	30.64	15	29.47	24	1.17	41.3	−0.7	66.2	24	49.9	11.0	28	33.4	55.2	33.1	16	6.0	11	74.4	32.7	3.78	−1.65	4,600	nw.	31	w.	24	13	14	10	5
Louisville	551	29.50	−.03	30.10	30.75	15	29.45	24	1.30	37.9	−1.1	66.8	18	46.3	8.0	27	29.8	58.8	29.2	16	5.2	1	68.9	27.8	2.56	−2.24	6,175	n.	36	s.	20	15	14	9	6
Indianapolis	766	29.25	−.01	30.09	30.81	15	29.32	24	1.49	30.5	−1.5	59.8	18	38.6	−2.1	9	22.6	61.9	27.6	25	4.0	20	74.2	22.8	1.45	−2.10	4,203	s.	24	nw.	7	11	14	7	8
Terre Haute	...	...	...	...	...	...	...	...	...	31.8	...	59.2	18	41.4	−3.5	9	22.3	62.7	35.0	8	5.3	2	...	...	1.64	...	...	w.	...	...	...	9	...	...	...
Cincinnati	628	29.41	−.03	30.11	30.79	15	29.43	24	1.36	34.9	−2.1	61.2	25	43.0	5.6	27	27.0	55.6	29.2	25	5.3	1	70.6	25.6	1.37	−2.68	5,166	sw.	33	nw.	25	13	13	9	7
Columbus	812	29.20	−.02	30.09	30.80	15	29.48	24	1.32	32.7	+0.7	55.4	23	41.2	4.0	9	24.8	51.4	31.7	16	5.5	1	67.1	22.3	1.30	−2.56	5,883	sw.	30	sw.	25	13	10	12	7
Pittsburg	847	29.15	−.04	30.05	30.81	15	29.41	25	1.40	34.1	+0.1	61.0	19	43.5	1.1	10	25.7	59.9	33.6	16	6.6	1	71.0	25.3	1.74	−0.93	5,181	nw.	28	sw.	20	12	9	15	5
Lexington	...	29.00	...	...	...	...	...	...	...	36.3	...	67.5	24	45.6	4.4	28	28.1	63.1	37.0	16	4.8	5	69.1	26.3	2.93	...	5,333	sw.	33	se.	20	15	11	13	5
Lower lake region.										25.1	−1.9														1.34	−1.36									
Buffalo	690	29.31	+.01	30.08	30.81	15	29.36	25	1.45	23.8	−0.2	51.2	20	32.3	−8.0	10	15.5	59.2	37.8	16	5.6	11	77.6	17.5	1.46	−1.28	8,173	sw.	52	sw.	26	13	10	17	2
Oswego	335	29.69	−.01	30.07	30.71	15	29.48	25	1.23	22.3	−3.7	48.1	20	29.6	−10.0	10	14.0	58.1	32.2	14	5.5	22	79.9	16.7	1.62	−0.91	8,706	se.	39	se.	25	12	18	10	1
Rochester	621	29.38	.00	30.08	30.78	15	29.41	25	1.37	24.2	−0.8	56.6	20	34.2	−8.0	10	16.2	64.6	39.1	16	7.8	11	78.4	18.1	0.85	−0.81	8,536	w.	45	w.	21	12	16	12	1
Erie	681	29.31	−.02	30.07	30.82	15	29.37	25	1.45	26.0	−2.0	51.0	20	37.8	−8.0	10	18.1	59.0	37.2	8	7.0	21	76.9	19.3	1.66	−1.99	6,750	s.	42	s.	25	9	11	12	6
Cleveland	690	29.30	−.03	30.07	30.85	15	29.31	25	1.54	27.8	+0.8	53.1	24	25.6	−3.1	10	20.0	56.2	38.9	16	5.5	11	77.3	21.3	1.55	−1.37	6,696	s.	30	sw.	25	11	11	10	8
Sandusky	638	29.38	−.01	30.09	30.88	15	29.30	25	1.58	26.9	−2.1	53.1	20	35.1	−3.0	15	19.3	56.1	36.9	16	4.6	1	77.4	20.5	1.26	−2.22	8,783	sw.	41	sw.	25	9	10	10	9
Toledo	673	29.33	−.03	30.07	30.87	15	29.22	25	1.65	25.8	−3.2	51.8	20	34.7	−6.5	9	17.6	58.3	37.8	16	4.1	1	79.3	19.8	0.75	−1.43	5,670	sw.	40	sw.	20	10	13	11	5
Detroit	662	29.32	−.02	30.07	30.89	15	29.20	25	1.69	24.1	−3.9	46.0	25	31.7	−7.0	15	16.7	53.0	33.0	16	3.0	1	77.3	17.6	1.58	−0.80	7,424	sw.	36	sw.	26	9	11	11	7
Upper lake region.										16.7	−2.5														1.28	−0.78									
Alpena	609	29.34	−.01	30.02	30.88	15	29.13	25	1.75	17.2	+0.2	48.0	13	25.0	−23.3	10	8.6	71.3	41.0	14	4.2	1	81.6	12.4	1.97	−0.26	6,194	w.	30	sw.	20	17	17	9	3
Escanaba	608	29.64	−.02	30.04	30.93	15	29.10	25	1.77	11.9	−3.1	40.0	13	21.8	−28.0	9	2.3	68.0	33.2	16	4.9	1	79.1	6.4	1.45	+0.05	5,151	n.	28	n.	14	8	14	13	2
Grand Haven	620	29.32	−.04	30.02	30.88	15	29.12	25	1.70	21.2	−3.8	43.7	20	29.3	−7.0	9	14.1	50.7	35.0	14	5.0	21	80.8	17.6	1.45	−0.90	7,821	w.	36	w.	20	13	18	10	1
Lansing	883	29.07	...	30.07	30.90	15	29.18	25	1.72	22.7	...	40.0	24	31.4	−11.8	9	13.1	57.8	37.5	14	6.0	1	77.8	16.5	1.92	...	5,444	sw.	30	sw.	20	12	10	13	6
Mackinaw City	605	29.32	−.04	30.03	30.90	15	29.12	25	1.78	12.8	−0.2	39.3	13	21.8	−24.0	15	1.8	63.3	41.3	13	5.0	2	89.5	10.1	0.84	−2.11	7,457	w.	42	e.	24	13	9	19	1
Marquette	672	29.25	−.05	30.03	30.94	15	29.22	25	1.72	12.0	−5.0	40.2	10	20.3	−26.6	9	3.2	66.8	40.3	16	5.6	2	74.9	5.5	1.16	−0.22	5,641	nw.	30	nw.	25	16	15	13	1
Port Huron	639	29.35	.00	30.07	30.88	15	29.21	25	1.67	22.3	−0.7	48.5	20	30.0	−12.6	9	14.7	61.1	33.3	16	3.6	27	81.2	17.0	1.78	−0.86	8,253	s.	48	sw.	20	8	10	15	4
Chicago	715	29.27	−.02	30.05	30.83	15	29.28	25	1.55	23.0	−5.0	47.2	20	30.9	−17.5	9	14.2	64.7	28.0	10	4.9	3	76.2	16.3	1.51	−0.93	7,703	w.	45	sw.	20	9	6	12	11
Milwaukee	697	29.20	−.02	30.04	30.90	15	29.25	25	1.65	19.8	−3.2	45.3	13	28.7	−20.7	9	4.5	66.0	34.0	14	4.5	4	82.0	15.1	1.08	−0.90	7,154	w.	30	sw.	13	13	5	18	6
Green Bay	616	29.34	...	30.05	30.97	15	29.24	25	1.73	15.2	−2.8	43.0	13	23.7	−26.6	9	5.8	69.6	30.1	16	4.5	2	86.9	11.7	2.11	...	4,921	s.	27	ne.	3	12	15	8	6
Duluth	672	29.28	−.02	30.04	30.93	15	29.54	19	1.39	12.0	−1.0	50.0	10	22.4	−32.5	9	2.9	82.5	50.0	16	9.0	2	86.2	8.4	0.24	−0.88	4,523	nw.	40	nw.	20	11	12	13	4
Extreme northwest.										5.0	+0.2														0.43	−0.33									
Moorhead	926	29.04	−.02	30.12	30.99	14	29.69	12	1.30	4.4	−1.6	38.0	17	14.4	−47.0	9	−5.7	85.0	35.5	13	6.0	10	84.6	0.6	0.42	−0.50	8,480	n.	50	s.	27	10	9	13	7
Saint Vincent	804	29.18	−.02	30.12	30.95	14	29.67	12	1.28	−0.1	−1.1	39.0	18	11.4	−49.9	9	−10.3	88.9	43.0	24	6.9	25	86.3	−3.4	0.22	−0.25	8,708	s.	48	s.	15	6	5	16	8
Bismarck	1,681	28.22	+.03	30.12	30.90	14	29.59	12	1.31	10.7	−0.3	45.6	23	22.7	−31.0	9	0.3	76.6	49.5	13	10.0	25	86.8	7.4	0.44	−0.19	6,355	nw.	51	nw.	24	12	8	12	9
Fort Buford	1,930	27.97	+.01	30.05	30.80	14	29.40	12	1.34	11.8	+1.8	49.2	23	25.0	−27.8	9	0.7	77.0	55.0	27	10.8	10	81.3	6.8	0.33	−0.15	6,125	nw.	46	w.	9	9	13	12	4
Fort Totten	1,487	28.40	+.03	30.12	30.92	14	29.60	27	1.32	3.2	+2.2	38.1	23	14.1	−41.5	9	−6.5	79.1	40.1	27	10.2	5	91.0	0.9	0.09	−0.49	9,149	nw.	50	s.	27	5	8	11	10
Fort Yates	...	...	...	...	...	...	...	...	...	15.3	...	47.0	23	25.6	−22.0	9	4.9	69.0	44.0	13	6.0	11	...	...	1.07	−0.46	...	se.	...	...	...	12	...	...	...

Table of miscellaneous meteorological data for February, 1888—Signal Service observations—Continued.

Stations and districts.	Elevation above sea-level, feet.	Atmospheric pressure, in inches and hundredths. Mean actual barometer.	Departure from normal.	Mean reduced barometer.	Extremes. Highest barometer.	Date.	Lowest barometer.	Date.	Monthly range of barometer.	Temperature of the air, in degrees Fahrenheit. Monthly mean.	Departure from normal.	Extremes. Max.	Date.	Mean max.	Min.	Date.	Mean min.	Monthly range.	Daily ranges. Greatest.	Date.	Least.	Date.	Mean relative humidity, per cent.	Mean temperature of dew-point, degrees Fahrenheit.	Precipitation, in inches.	Departure from normal precipitation, in inches.	Winds. Total movement, miles.	Prevailing direction.	Maximum velocity. Miles p. h.	Direction.	Date.	No. of rainy days.	No. of cloudy days.	No. of fair days.	No. of clear days.
Upper Miss. Valley.										23.7	−3.7														1.59	−0.69									
Saint Paul	831	29.10	−.02	30.05	30.91	15	29.54	19	1.37	12.4	−4.6	45.3	13	23.9	−33.0	9	2.5	78.3	44.6	16	8.5	23	81.3	7.5	0.64	−0.33	4,743	w.	28	w.	25	12	11	13	5
La Crosse	744	29.25	+.01	30.09	30.95	15	29.51	25	1.44	15.6	−5.4	48.0	18	25.7	−28.0	9	5.9	76.0	42.3	14	5.0	3	80.1	10.1	0.61	−0.50	5,310	s.	29	nw.	14	7	10	14	5
Davenport	615	29.38	−.03	30.07	30.88	15	29.46	19	1.42	20.8	−5.2	59.5	19	30.5	−20.6	9	12.0	80.1	34.9	14	5.6	29	81.4	15.6	1.17	−0.58	5,367	nw.	36	w.	26	8	8	11	10
Des Moines	866	29.14	−.01	30.09	30.92	15	29.56	19	1.36	22.6	−1.4	57.2	17	32.7	−20.6	9	13.5	77.8	37.8	28	4.6	3	79.9	16.8	1.51	−0.07	4,816	nw.	27	nw.	24	8	2	19	8
Dubuque	665	29.34	.00	30.09	30.90	15	29.46	25	1.44	18.8	−4.2	51.0	13	28.2	−23.0	9	8.8	74.0	41.0	14	5.5	23	77.0	12.5	1.31	−0.34	2,994	nw.	24	w.	25	8	5	13	11
Keokuk	618	29.31	−.10	30.00	30.86	15	29.42	19	1.44	25.7	−2.3	61.0	19	35.3	−12.0	9	17.2	73.0	35.0	14	3.2	2	78.2	19.5	2.17	+0.26	6,630	nw.	30	s.	19	9	6	8	15
Cairo	359	29.71	−.04	30.10	30.72	24	29.48	24	1.24	37.5	−2.5	65.5	19	45.3	9.5	27	29.9	56.0	26.0	17	3.5	17	72.0	28.3	2.51	−1.73	6,742	n.	40	s.	19	10	10	13	6
Springfield	644	29.40	−.01	30.11	30.86	15	29.38	24	1.48	27.3	−4.7	54.5	19	35.9	−9.0	9	19.5	63.5	28.0	12	3.4	4	78.8	21.2	2.03	−2.41	5,956	nw.	33	w.	19	6	9	14	6
Saint Louis	571	29.46	−.03	30.10	30.80	15	29.45	24	1.35	32.2	−2.8	62.8	29	41.7	−3.5	9	24.4	66.3	29.7	12	6.5	3	76.8	25.2	2.39	−0.55	7,273	s.	48	sw.	19	9	11	9	9
Missouri Valley.										26.5	+2.4														0.85	+0.04									
Lamar	1,028	29.01	.....	30.13	30.79	15	29.61	19	1.18	36.7	+0.7	69.0	13	46.7	7.0	27	27.0	62.0	41.8	28	10.2	4	76.8	29.5	1.94	+0.44	8,024	n.	42	s.	28	10	8	13	8
Springfield	1,356	28.60	.....	30.09	30.71	15	29.59	24	1.12	37.0	+1.0	69.0	13	48.9	5.0	27	27.5	64.0	39.4	28	9.5	25	75.6	29.0	1.22	....	7,380	nw.	36	nw.	26	13	9	12	8
Leavenworth	842	29.18	−.02	30.10	30.85	15	29.50	19	1.35	31.4	+1.4	62.4	13	41.8	−5.0	9	22.9	67.4	37.0	14	3.5	3	71.5	22.7	1.24	−0.26	5,277	n.	28	nw.	19	6	6	15	8
Topeka	......	......	.....	......	......	..	......	..	....	32.9	......	65.0	13	44.3	−4.0	9	22.7	69.0	39.0	14	6.3	3	82.1	27.5	1.43	....	......	......	...	......	..	10	7	12	10
Omaha	1,113	28.89	−.02	30.12	30.96	14	29.64	19	1.32	25.9	+1.9	62.5	17	36.3	−17.2	9	17.3	79.7	33.9	17	6.4	3	70.3	17.0	0.74	−0.07	5,773	s.	42	n.	24	5	3	12	14
Crete	......	......	.....	......	......	..	......	..	....	27.3	......	67.5	17	39.4	−15.4	9	17.4	82.9	42.5	17	7.1	3	79.6	21.3	0.61	....	......	......	...	......	..	5	5	17	6
Valentine	2,614	27.25	.....	30.05	30.74	14	29.60	13	1.14	27.7	+8.7	62.2	1	41.2	−8.0	27	15.3	70.2	66.0	27	7.6	3	70.1	18.0	0.75	+0.37	7,173	n.	48	nw.	24	7	8	12	9
Fort Sully	1,600	28.31	−.07	30.09	30.86	14	29.59	13	1.27	17.8	+2.8	56.6	23	29.1	−20.5	9	8.5	77.1	50.8	27	4.7	3	77.0	11.5	0.35	+0.12	5,841	w.	41	w.	6	8	6	16	7
Huron	1,307	28.64	−.02	30.10	30.94	14	29.56	13	1.38	14.0	0.0	44.8	23	24.9	−32.2	9	4.3	77.0	43.7	15	7.0	3	81.8	9.1	0.52	+0.05	7,416	nw.	47	nw.	6	12	6	13	10
Yankton	1,234	28.72	−.03	30.08	30.94	14	29.62	13	1.32	21.7	+2.7	55.8	23	33.3	−19.4	9	11.5	75.2	45.2	13	5.9	3	75.3	14.5	0.41	−0.40	6,462	nw.	36	nw.	26	6	5	16	8
Northern slope.										26.7	+5.4														1.04	+0.04									
Fort Assinaboine	2,720	27.15	+.01	30.07	30.62	13	29.56	12	1.06	20.7	+3.7	49.2	17	30.1	−21.8	14	11.7	71.0	65.2	15	4.6	29	70.7	12.5	1.47	−0.94	6,977	sw.	40	nw.	21	11	16	12	1
Fort Custer	3,040	26.81	−.03	30.05	30.60	14	29.50	12	1.10	28.3	+6.3	60.6	27	40.1	−2.2	29	16.1	62.8	49.0	13	7.3	25	76.5	20.9	0.57	+0.10	4,551	n.	30	n.	23	9	10	12	7
Fort Maginnis	4,340	25.48	.00	29.98	30.46	13	29.42	12	1.04	28.8	+8.8	60.2	17	41.2	−4.8	13	19.4	65.0	51.8	13	7.1	6	79.5	22.5	3.37	+2.33	9,006	nw.	48	nw.	23	15	14	11	4
Helena	4,069	25.80	.00	30.02	30.36	16	29.42	12	0.94	35.0	+11.0	56.5	12	43.0	−1.0	29	26.8	57.5	35.5	26	6.3	25	49.5	17.0	0.12	−0.58	6,777	sw.	50	sw.	8	4	9	17	3
Poplar River	2,030	27.87	−.03	30.10	30.78	14	29.55	12	1.23	9.4	−5.4	42.4	23	23.0	−31.0	9	−2.8	73.4	42.5	27	8.0	2	80.6	4.5	0.60	+0.11	4,079	w.	37	nw.	24	9	7	18	9
Rapid City	......	26.57	.....	......	......	..	......	..	....	28.5	......	59.3	17	39.8	−3.1	9	16.9	62.4	56.2	27	9.0	24	76.8	21.9	1.62	....	5,014	w.	42	w.	13	9	5	18	6
Cheyenne	6,105	23.91	.00	29.99	30.52	14	29.59	9	0.93	32.9	+6.9	56.2	17	44.2	7.5	5	17.0	48.7	40.8	23	11.6	25	56.1	15.2	0.72	+0.46	8,971	nw.	48	nw.	8	9	4	10	15
Laramie	......	......	.....	......	......	..	......	..	....	35.3	......	64.1	17	49.5	9.0	27	21.1	55.1	49.9	15	9.0	4	....	....	1.05	−1.12	......	w.	...	......	..	6	..	..	..
North Platte	2,841	27.04	−.03	30.05	30.74	14	29.69	18	1.05	31.5	+6.5	67.8	13	44.7	−4.2	9	20.2	72.0	49.5	27	10.5	18	69.7	21.3	0.42	+0.06	6,263	nw.	48	nw.	24	5	4	15	10
Middle slope.										36.5	+6.7														0.77	+0.04									
Colorado Springs	......	......	.....	......	......	..	......	..	....	36.1	......	64.2	13	48.9	9.6	26	23.8	54.6	51.2	27	9.7	24	59.4	21.3	0.45	....	......	......	...	......	..	8	5	13	11
Denver	5,281	24.68	+.01	29.99	30.48	14	29.56	10	0.92	38.6	+7.6	70.5	12	51.5	15.5	6	26.6	55.0	46.6	27	10.3	25	52.7	20.8	0.37	−0.12	4,477	s.	35	n.	18	5	8	8	13
Pike's Peak	14,134	17.56	.....	30.06	30.56	22	29.48	29	1.08	7.0	......	26.1	17	14.2	−10.8	26	2.1	30.9	22.2	24	6.3	2	76.6	0.4	1.15	−0.23	15,884	sw.	84	w.	28	11	2	16	11
Las Animas	3,899	25.99	−.02	30.00	30.62	14	29.43	18	1.19	37.9	+8.9	72.0	13	54.1	13.7	15	24.3	58.3	49.7	27	6.0	4	56.4	20.1	0.59	+0.32	4,811	w.	36	n.	19	4	5	16	8
Concordia	1,384	28.57	.....	30.07	30.83	15	29.59	19	1.24	32.4	+5.4	71.1	13	44.5	−7.8	9	22.3	78.9	39.2	13	10.2	2	65.3	21.4	0.46	−0.34	5,382	s.	30	nw.	19	4	4	14	11
Dodge City	2,524	27.38	−.03	30.08	30.81	15	29.55	18	1.26	32.7	+6.7	78.3	13	52.7	4.5	9	25.9	73.8	43.2	28	7.5	3	70.5	26.7	0.73	+0.20	6,586	ne.	36	s.	27	6	2	12	14
Fort Reno	......	......	.....	......	......	..	......	..	....	41.7	......	73.1	13	53.5	10.0	28	29.9	63.1	....	..	....	..	....	....	1.11	+0.12	......	n.	...	......	..	11	..	..	..
Fort Supply	......	......	.....	......	......	..	......	..	....	44.2	......	75.8	13	57.1	13.0	27	31.3	62.8	42.0	17	7.0	19	....	....	1.11	+0.31	......	n.	...	......	..	6	..	..	..
Fort Elliott	2,650	27.24	+.02	29.98	30.64	15	29.44	18	1.20	41.0	+5.0	78.0	13	54.4	9.4	9	29.7	68.6	47.0	28	9.3	1	77.8	33.6	0.61	+0.09	8,410	n.	48	n.	24	5	3	18	8
Southern slope.										46.5	+0.8														1.64	+0.89									
Fort Sill	1,200	28.80	−.05	30.08	30.66	15	29.64	18	1.02	43.2	+2.2	74.8	13	53.6	18.8	15	34.9	56.0	36.3	12	4.0	4	79.3	36.4	2.17	+0.62	7,251	n.	50	n.	14	10	7	13	9
Abilene	1,748	28.21	.....	30.05	30.64	15	29.62	10	1.02	48.0	0.0	76.6	13	59.2	21.2	15	38.1	55.4	49.5	10	9.0	23	86.2	43.5	2.40	+1.49	8,130	sw.	37	sw.	28	8	5	16	8
Fort Davis	4,928	25.14	−.05	30.00	30.49	15	29.70	10	0.79	48.2	+0.2	69.2	29	57.8	28.0	15	34.8	41.2	31.0	27	9.8	23	39.8	23.7	0.89	+0.70	6,138	sw.	38	sw.	29	7	1	14	14
Fort Stanton	6,154	23.88	.....	29.87	30.41	16	29.50	9	0.91	38.0	......	65.0	13	49.4	16.5	25	27.3	48.5	38.5	13	6.2	21	54.3	21.4	1.09	+0.76	6,400	nw.	48	nw.	10	6	5	12	12
Southern plateau.										45.8	+3.0														1.15	−0.12									
El Paso	3,764	26.24	−.02	30.01	30.41	16	29.70	29	0.71	50.1	+1.1	74.0	28	62.5	29.0	3	37.0	45.0	38.8	18	12.0	22	62.1	36.0	1.51	+1.11	2,623	nw.	20	nw.	10	6	3	11	15
Lava	......	......	.....	......	......	..	......	..	....	42.0	......	66.2	12	55.7	20.0	8	28.2	46.2	....	..	....	..	....	....	1.75	+1.41	......	sw.	...	......	..	10	..	..	..
Santa Fé	7,026	23.19	−.01	30.01	30.45	15	29.66	10	0.79	35.5	+3.5	55.0	13	44.6	16.0	25	27.1	39.0	28.0	25	7.2	19	61.7	22.4	0.90	+0.24	4,595	n.	27	n.	11	6	4	13	12
Fort Apache	5,050	25.00	−.02	30.05	30.28	16	29.61	29	0.67	41.6	+3.6	68.1	12	55.4	23.9	7	29.1	44.2	40.8	12	13.0	17	66.8	29.7	1.83	+0.16	4,385	n.	38	sw.	29	9	4	11	14
Fort Bowie	......	......	.....	......	......	..	......	..	....	46.4	......	65.0	28	54.3	30.5	24	38.5	34.5	25.0	24	9.6	22	....	....	1.50	−1.94	......	sw.	...	......	..	11	..	..	..
Fort Grant	4,910	25.15	−.11	30.00	30.21	23	29.63	29	0.58	47.0	+2.0	68.4	28	57.1	29.3	23	37.4	39.1	29.1	25	10.2	10	48.1	27.5	0.44	−0.96	4,972	nw.	36	se.	16	7	4	15	10
Fort McDowell	......	......	.....	......	......	..	......	..	....	53.3	......	81.0	27	68.8	31.0	8	37.8	50.0	42.0	27	20.0	5	....	....	0.72	−1.61	......	sw.	...	......	..	5	..	..	..
Fort Thomas	2,710	......	.....	......	......	..	......	..	....	49.6	......	74.9	28	62.6	29.0	24	36.6	45.9	37.3	25	7.3	2	....	....	1.06	−0.11	......	w.	...	......	..	6	..	..	..
Fort Verde	......	......	.....	......	......	..	......	..	....	48.8	......	73.4	28	65.0	25.0	9	32.5	48.4	....	..	....	..	....	....	1.56	+0.53	......	sw.	...	......	..	7	..	..	..
Prescott	5,389	24.69	−.02	30.02	30.27	23	29.59	29	0.68	40.4	+4.4	63.2	12	53.4	22.5	21	28.9	40.7	35.9	27	14.5	2	68.9	30.0	1.68	+0.20	3,848	sw.	40	sw.	29	8	3	13	13
San Carlos	......	......	.....	......	......	..	......	..	....	50.8	......	73.5	28	64.0	30.0	8	37.7	43.5	39.5	27	12.0	2	....	....	1.03	−0.74	......	s.	...	......	..	10	..	..	..
Willcox	......	......	.....	......	......	..	......	..	....	47.3	......	76.3	6	65.5	22.0	25	29.2	54.3	53.7	27	15.7	21	....	....	1.21	−0.15	......	nw.	...	......	..	8	..	..	..
Yuma	141	29.84	−.07	30.00	30.19	23	29.70	29	0.49	60.5	+3.5	84.8	27	73.3	39.0	20	46.4	45.8	38.0	27	15.9	29	55.2	42.4	0.05	−0.43	4,854	s.	36	w.	29	1	0	8	20
Keeler	3,622	26.34	.....	30.01	30.22	24	29.49	28	0.73	47.8	......	68.6	24	57.9	30.0	6	39.4	38.6	27.5	19	9.3	16	52.4	29.3	1.21	+0.67	4,772	n.	40	nw.	19	4	3	9	17
Middle plateau.										37.8	+6.2														0.91	−0.32									
Fort Bidwell	4,615	25.44	.....	30.18	30.51	19	29.78	27	0.73	36.6	......	61.6	26	48.4	11.2	29	25.6	50.4	32.9	26	10.7	10	79.0	30.2	1.81	−1.07	3,865	w.	36	sw.	12	6	5	10	14
Winnemucca	4,358	25.70	+.04	30.14	30.51	19	29.61	28	0.90	38.9	+5.9	62.9	26	49.9	16.6	29	28.2	46.3	37.9	26	6.8	4	68.9	27.8	0.63	−0.38	4,991	sw.	28	sw.	12	7	7	8	14
Salt Lake City	4,348	25.66	−.01	30.10	30.41	16	29.47	29	0.94	38.5	+6.5	58.7	27	45.7	23.5	19	30.9	35.2	26.6	27	7.9	4	67.7	27.9	1.22	−0.17	3,201	nw.	28	e.	13	7	8	16	5
Montrose	5,780	24.26	.....	30.04	30.45	16	29.47	29	0.98	34.9	......	56.6	28	46.7	15.9	6	24.0	40.7	35.5	27	14.0	10	64.5	23.0	0.38	+0.18	2,579	se.	26	w.	24	6	5	16	8
Fort Bridger	6,643	23.47	.....	*30.11	30.55	15	29.44	29	1.11	26.8	......	51.0	12	36.6	2.0	7	16.5	49.0	32.0	8	10.3	13	56.7	12.7	0.53	−0.16	8,287	w.	42	w.	25	8	9	19	1
Fort Washakie	......	24.40	.....	......	......	..	......	..	....	31.3	......	55.0	12	42.1	2.0	5	20.1	53.0	34.0	27	9.0	3	....	....	0.94	....	4,793	sw.	48	s.	8	5	5	15	9
Northern plateau.										41.3	+9.3														0.91	−1.28									
Boisé City	2,750	27.26	+.02	30.15	30.50	16	29.64	27	0.86	40.3	+7.3	63.8	27	49.3	24.0	7	29.9	39.8	30.8	25	8.8	4	70.2	30.4	0.50	−1.17	2,300	w.	24	n.	23	6	4	13	12
Ashland	......	.....	.....	......	......	..	......	..	....	44.3	......	69.0	26	56.8	20.0	29	31.5	49.0	38.0	26	11.0	12	....	....	1.11	−1.35	......	w.	...	......	..	9	..	..	..
Fort Klamath	......	......	.....	......	......	..	......	..	....	32.0	......	57.0	21	43.0	1.0	29	21.1	56.0	31.0	29	8.0	11	....	....	1.38	−2.35	......	w.	...	......	..	7	..	..	..
Lakeview	......	......	.....	......	......	..	......	..	....	37.2	......	61.0	26	47.7	13.0	29	26.8	48.0	34.5	26	7.5	11	....	....	1.26	−0.53	......	s.	...	......	..	6	..	..	..
Linkville	......	......	.....	......	......	..	......	..	....	37.6	......	61.5	26	47.6	12.9	29	27.7	48.6	31.3	26	8.1	12	....	....	0.70	−1.08	......	n.	...	......	..	4	..	..	..
Spokane Falls	1,909	28.03	+.02	30.09	30.44	24	29.47	12	0.97	38.3	+10.3	58.0	26	47.9	22.0	29	30.3	36.0	30.2	17	5.4	6	81.4	32.4	0.64	−1.73	2,787	sw.	30	sw.	12	7	10	16	6
Walla Walla	1,018	29.02	.....	30.13	30.51	24	29.54	12	0.97	45.4	+10.4	65.1	12	53.5	30.9	14	38.0	34.2	27.3	17	5.9	4	66.3	33.9	0.80	−0.74	4,213	sw.	35	sw.	12	7	9	12	8
Carson City	......	......	.....	......	......	..	......	..	....	40.3	......	62.6	26	51.3	16.8	29	28.0	45.8	38.3	26	12.1	10	52.0	23.0	0.17	....	......	......	...	......	..	1	3	8	18
N. Pac. coast region.										43.0	+2.0														3.25	−3.93									
Fort Canby	179	29.92	+.04	30.12	30.54	24	29.37	12	1.17	43.3	−0.7	56.0	1	47.7	34.8	6	39.4	21.2	15.0	16	3.9	2	91.8	41.0	3.69	−3.18	6,568	se.	81	s.	12	15	14	10	5
Neah Bay	......	......	.....	......	......	..	......	..	....	43.4	......	59.5	15	49.7	30.0	29	37.1	....	....	..	....	..	....	....	7.86	....	......	e.	...	......	..	16	..	..	..
Olympia	36	30.11	+.06	30.16	30.57	24	29.37	12	1.20	42.2	+3.2	59.0	26	48.2	29.0	14	37.3	30.0	22.0	14	3.5	4	90.2	39.3	2.71	−5.64	2,094	s.	24	sw.	12	12	19	6	4
Port Angeles	14	30.10	.....	30.11	30.52	24	29.13	12	1.39	40.5	+1.5	51.9	12	44.9	28.8	29	35.3	23.1	15.2	15	3.2	25	93.4	28.7	1.58	−2.40	1,837	s.	18	w.	23	16	18	9	2
Tatoosh Island	86	30.02	+.08	30.10	30.55	24	29.08	12	1.47	43.2	+1.2	51.4	12	46.2	35.0	19	40.6	16.4	11.9	19	3.7	6	91.7	40.8	5.42	−4.81	8,644	e.	60	se.	12	22	20	6	3
Astoria	......	30.10	.....	30.12	30.53	24	29.37	12	1.16	42.8	......	54.0	12	48.0	32.0	10	39.2	22.0	21.0	16	4.0	23	91.6	40.5	4.12	−3.86	3,897	sw.	48	sw.	12	16	15	9	5
Portland	80	30.08	+.05	30.17	30.57	24	29.56	12	1.01	44.0	+4.0	60.8	26	51.6	30.0	8	36.0	30.8	27.5	16	7.2	9	90.2	41.1	2.42	−5.68	2,519	nw.	30	s.	12	12	9	15	5
Roseburg	523	29.60	+.02	30.17	30.53	18	29.65	12	0.88	44.5	+2.5	67.2	26	54.6	28.2	29	36.8	39.0	34.5	26	8.8	1	83.8	39.5	2.81	−1.91	1,568	w.	31	s.	13	14	5	16	8
Mid. Pac. coast reg.										53.1	+3.1														1.23	−2.49									
Eureka	......	30.08	.....	30.13	30.47	18	29.83	12	0.64	48.1	......	64.9	11	54.8	31.3	29	42.7	33.6	21.2	25	4.9	27	84.8	43.5	1.98	....	4,224	n.	36	n.	27	10	10	13	6
Red Bluff	342	29.74	−.03	30.09	30.36	19	29.75	29	0.61	53.9	+4.9	81.5	25	63.7	33.5	29	42.8	48.0	31.0	25	4.0	11	58.2	36.5	2.17	−1.62	4,810	n.	38	n.	20	5	4	9	16
Sacramento	64	30.02	−.04	30.08	30.30	19	29.79	27	0.51	52.6	+2.6	75.0	26	62.2	34.0	3	43.7	41.0	28.5	25	10.0	12	72.1	42.8	0.57	−2.81	4,500	se.	36	nw.	20	5	1	7	21
San Francisco	60	30.04	−.03	30.11	30.32	18	29.84	29	0.48	52.8	+1.8	76.3	22	60.7	41.9	29	47.1	34.4	25.3	25	5.3	8	76.2	44.5	0.94	−3.05	4,434	w.	25	w.	26	5	6	11	12
S. Pac. coast region.										54.6	+0.6														1.14	−2.14									
Fresno	313	29.74	.....	30.08	30.30	19	29.79	27	0.51	53.2	......	83.0	26	65.5	29.6	29	40.4	53.4	35.5	26	6.9	1	74.2	44.3	0.13	....	2,674	n.	18	n.	28	1	0	8	21
Los Angeles	339	29.69	−.02	30.05	30.24	23	29.76	29	0.48	54.4	+0.4	73.5	22	63.5	39.2	3	45.5	34.3	29.7	23	5.0	16	83.2	48.9	0.80	−3.27	3,516	w.	23	ne.	21	5	7	8	14
San Diego	67	29.99	−.03	30.06	30.25	17	29.80	29	0.45	54.9	+0.9	66.8	23	61.4	42.5	8	47.5	24.3	22.0	22	6.0	1	77.0	47.3	1.48	−1.01	3,113	nw.	24	w.	29	5	6	11	12

NOTE.—The data at Pike's Peak, Colo., and stations having no departures are not used in computing the district averages. * Record for 25 days. † Record for 18 days.

Meteorological record of voluntary observers and Army post surgeons, February, 1888.

The maximum and minimum temperatures at stations marked thus (*) are from readings of other than standard instruments.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation.
Alabama.	°	°	°	*Inches*
Auburn	67	21	52.1	7.34
Bermuda	75	28	54.0	2.05
Greensborough	72	24	53.1	4.38
Greenville	73	24	54.5	.....
Livingston	72	28	51.0	4.03
Mt. Vernon B'ks	79	31	57.1	10.37
Newmarket	62	12	45.4	2.55
Newton	79	31	58.6	3.50
Tuscaloosa	67	19	54.9	3.04
Union Spring	67	24	53.0	0.57
Arizona.				
Huachuca, Fort	71	28	.....	0.30
McDowell, Fort	84	32	.....	0.64
Mojave, Fort	79	25	57.0	0.55
Arkansas.				
Eureka Springs	70	7	41.9	0.95
Hot Springs	.....	19	44.2	2.68
Lead Hill	73	11	41.1	1.81
British Columbia.				
New Westminster	51	31	41.0	5.56
California.				
Alcatraz Island	75	41	51.5	0.98
Banning	78	32	55.0	3.50
E. Pasadena	73	38	54.6	0.57
Gaston, Fort	75	20	43.9	5.36
Georgetown	71	25	48.1	2.79
Hydesville	65	26	.....	1.85
Lewis Creek*	77	36	56.0	0.46
Nicolaus *	79	35	52.3	0.70
Oakland	70	39	52.3	1.02
Oroville	79	34	55.2	0.99
Presidio of San F	78	34	51.7	0.78
Riverside	78	33	52.6	0.90
Sacramento	72	28	47.9	0.55
Salinas	74	35	50.3	0.53
Santa Barbara	58	49	53.8	1.30
Santa Maria	71	32	53.0	0.43
Willows	78	28	51.7	0.40
Colorado.				
Fort Collins	68	14	36.7	.....
Grand Junction*	66	19	36.6	0.39
Lewis, Fort	50	— 8	29.3	0.20
Connecticut.				
Hartford	48	—10	22.3	5.77
New Hartford	42	—14	18.8	7.07
Voluntown	53	— 6	28.8	4.20
Dakota.				
A. Lincoln, Fort	47	—33	10.0	0.98
Garden City	47	—31	10.8	0.40
Highmore	51	—29	15.6	.....
Meade, Fort	59	—10	27.7	1.29
Parkston	52	—20	19.5	0.68
Pembina, Fort	38	—48	.....	0.26
Randall, Fort	55	—20	22.9	0.47
Richardton	46	—25	11.8	1.87
Sisseton, Fort	40	—35	6.4	0.17
Sully, Fort	63	—19	18.3	0.34
Totten, Fort	.....	—40	3.8	0.22
Webster	47	—38	11.9	1.00
Yates, Fort	50	—25	.....	0.16
District of Columbia.				
Distribut'g res'v'r *	57	15	35.6	3.58
Receiving res'v'r*	58	10	35.4	3.37
Aqueduct office*	61	14	38.6	.....
Florida.				
Aiva *	84	43	64.3	4.25
Archer	82	32	62.0	5.41
Duke	78	32	61.6	7.35
Fort Meade *	85	43	64.0	5.18
Humboldt *	85	42	66.3	3.95
Limona *	86	40	69.4	5.89
Manatee	88	42	65.9	6.82
Merritt's Island	82	42	64.8	6.01
St. Francis Bar'cks	78	36	60.0	9.20
Tallahassee	75	30	57.0	8.10
Georgia.				
Forsyth *	72	23	54.0	7.37
Marietta	67	11	47.9	4.47
Milledgeville *	68	22	52.0	6.34
Quitman	76	32	.....	7.75
Idaho.				
Boisé Barracks	64	22	40.2	0.40
Lewiston	65	26	.....	0.61
Sherman, Fort	57	15	.....	0.62
Illinois.				
Charleston *	57	— 7	28.1	2.70
Collinsville	62	— 2	.....	2.18
Jacksonville	56	— 8	27.9	1.82
Ottawa	48	24	21.2	1.54
Palestine	56	2	33.2	1.47
Pekin	53	—11	20.7	1.63
Rockford	44	—26	18.9	1.30
Sandwich *	46	—22	23.8	2.59
Sycamore	41	—24	18.9	1.16
Windsor	56	— 7	27.2	2.47
Indiana.				
Butlerville*	62	5	32.9	2.30
Degonia Springs	58	8	35.1	3.09
Jeffersonville	64	11	35.9	2.20
Laconia	60	7	34.1	1.90
Lafayette	58	—10	27.2	1.51
La Grange	46	—12	22.7	1.97
Logansport *	58	— 8	28.4	2.65
Mauzy	55	— 2	28.5	2.41
Mount Vernon	62	6	38.5	1.39
Princetown	64	2	33.0	1.50
Sunman *	55	3	30.9	2.28
Spiceland	58	— 2	30.5	1.40
Vevay	65	8	33.8	1.64
Indian Territory.				
Gibson, Fort	66	10	40.6	1.48
Reno, Fort	74	10	41.1	1.09
Supply, Fort	78	8	.....	0.82
Iowa.				
Ames	46	—25	20.5	1.30
Auburn	50	—23	26.3†	0.64
Bancroft	43	—30	14.4	0.45
Cedar Rapids b	49	—26	20.6	1.37
Clear Lake	41	—32	15.4	0.39
Clinton	40	—29	18.6	1.06
Clarinda	54	— 4	31.7	1.40
Cresco	46	—34	12.9	1.02
Cromwell	45	—19	.....	1.35
Des Moines	52	—25	22.9	2.00
Denmark	55	— 2	29.3	1.86
Dysart	46	—32	.....	1.75
Fairfield	57	—18	24.3	.....
Fort Madison	59	—15	.....	2.50
Glenwood a	64	—20	25.8	0.91
Humboldt	42	—34	.....	0.57
Independence *	43	—29	16.0	1.50
Logan *	56	—20	20.8	0.90
Manson	50	—34	28.0	1.27
Maquoketa	52	8	.....	1.39
Monticello	49	—28	18.1	1.48
Mount Vernon*	50	—30	18.9	.....
Muscatine	51	—20	20.9	0.70
Osceola	48	—26	16.3	0.91
Oskaloosa a	49	—23	.....	0.35
Oskaloosa b *	51	—23	23.5	0.90
Sac City	47	—26	18.4	0.92
Kansas.				
Cawker City	66	3	31.4	0.40
Eustis	69	7	34.4	1.21
Globe	58	— 2	31.9	1.16
Gibson	74	2	35.1	0.83
Grenola	67	9	30.7	0.95
Hays, Fort	79	— 2	35.6	0.15
Independence	64	10	37.1	2.23
Lawrence	57	— 1	32.7	1.27
Lebo	69	— 2	32.7	1.22
Manhattan a	68	— 4	26.7	2.87
Morse*	56	2	31.4	2.00
Ninnescah	74	2	35.0	1.01
Riley, Fort	69	— 5	.....	1.58
Rome	70	10	37.7	1.04
Salina *	55	14	36.2	0.09
Sedan	68	10	37.4	3.74
Wakefield*	70	— 1	33.4	1.65
Washburn College	54	3	32.9	1.43
Waterville	59	— 7	32.4	0.76
Wellington	65	10	39.0	1.12
Wilson	77	0	34.5	0.49
Yates Centre	66	8	37.4	1.49
Tribune	70	8	36.8	1.69
Kentucky.				
Bowling Green*	72	10	.....	.....
Carlisle	62	4	35.0	2.36
Frankfort	69	7	.....	2.23
Louisiana.				
Grand Coteau	72	36	58.0	7.44
Liberty Hill	71	31	56.3	3.90
Luling	76	35	.....	8.19
Maine.				
Cornish	48	11	30.4	4.10
Gardiner	46	—12	21.3	5.90
Orono	44	—19	19.0	6.11
Skowhegan	41	—20	15.5	3.63
Maryland.				
Cumberland	52	9	32.8	2.15
Great Falls *	59	9	35.2	2.96
McDonogh	54	8	32.6	3.27
McHenry, Fort	55	10	34.2	1.80
Mount St. Mary's	49	7	34.0	1.35
New Midway*	50	4	33.1	4.02
Woodstock	58	6	32.5	3.00
Massachusetts.				
Amherst a	46	—19	22.0	3.94
Amherst b	48	—16	24.8	4.25
Blue Hill Observ'y	52	— 7	25.1	2.95
Deerfield	47	—22	.....	5.87
Dudley	50	—10	25.2	3.09
Fall River	50	1	27.5	3.55
Milton	52	— 4	28.0	2.66
New Bedford	50	— 5	27.9	2.62
Newburyport	54	— 5	26.4	3.15
Provincetown	50	4	29.9	2.74
Somerset	52	— 5	28.6	2.87
Taunton	54	— 2	29.1	3.08
Westborough *	55	— 8	27.5	3.66

Meteorological record of voluntary observers, etc.—Continued.

Stations.	Temperature. (Fahrenheit.) Maximum.	Minimum.	Mean.	Precipitation.
Mexico.	°	°	°	*Inches*
Leon de Aldamas	76	28	58.5	0.40
Michigan.				
Adrian	48	—13	23.5	2.20
Benton Harbor	46	—15	17.5	1.71
Birmingham	45	—18	21.9	1.41
Brady, Fort	36	—35	.....	1.26
Central Mine	47	—32	11.0	2.60
Hanover	44	— 9	23.3	1.50
Harrisville*	46	—26	20.8	2.10
Hudson	44	—15	21.6	2.57
Kalamazoo a	46	— 8	22.8	1.50
Kalamazoo b	43	— 6	18.5	1.50
Lansing	44	—16	22.4	1.74
Mottville *	45	—20	22.0	1.68
Saint Louis	45	—19	21.6	1.63
Thornville *	47	—16	22.4	0.83
Traverse City	48	—26	15.0	1.77
Minnesota.				
Minneapolis	40	—35	11.5	1.11
Snelling, Fort	41	—39	10.5	1.84
Mississippi.				
Biloxi	67	32	57.2	8.90
Palo Alto	71	23	49.1	4.49
Missouri.				
Conception	.....	—17	25.7	2.50
Fayette	66	5	32.9	2.23
Frankford	54	— 8	25.2	2.18
Pierce City	69	3	39.2	2.00
Warrenton	62	— 3	32.5	.....
Montana.				
Keogh, Fort	50	—20	.....	1.43
Missoula, Fort	.....	.....	.....	0.22
Shaw, Fort	58	— 4	31.6	0.00
Virginia City	54	0	.....	.....
Nebraska.				
Brownville *	67	—14	29.2	1.30
De Soto *	50	—19	24.6	0.68
Fairbury	.....	—10	.....	0.50
Fremont *	62	—15	23.5	2.50
Genoa	62	—20	25.5	0.64
Hay Springs	56	— 2	27.9	1.22
Lincoln	63	—16	.....	0.49
Marquette	62	0	.....	0.73
Niobrara, Fort	65	— 9	27.4	0.30
Robinson, Fort	.....	— 3	31.6	0.09
Sidney, Fort	67	11	.....	0.64
Weeping Water	62	—19	25.5	0.87
Nevada.				
McDermit, Fort	57	17	37.2	3.17
New Hampshire.				
Berlin Mills	40	—25	.....	1.80
Concord	56	—12	23.0	3.69
Nashua	52	—12	23.8	4.17
New Jersey.				
Beverly	58	2	31.7	2.55
Clayton *	58	6	33.3	2.52
Egg Harbor City	53	3	32.5	2.78
Moorestown	55	1	32.2	2.11
Readington *	56	2	33.9	.....
South Orange	50	2	29.4	4.12
Vineland	59	5	37.0	2.52
New Mexico.				
Bayard, Fort	71	27	43.5	0.29
Gallinas Spring	65	25	.....	0.27
Las Vegas	70	10	35.5	0.76
Selden, Fort	75	23	47.2	0.12
Union, Fort	63	11	37.4	1.14
Wingate, Fort	54	14	.....	1.30
New York.				
Albany	43	—10	21.8	1.39
Ardenia	50	— 3	.....	3.94
Auburn	50	— 6	25.9	1.63
Boyd's Corners	48	— 9	.....	5.07
Brooklyn	52	2	32.0	2.84
Cooperstown	47	—22	20.5	1.58
Factoryville	49	—20	22.0	0.86
Friendship	50	—10	25.2	0.65
Humphrey	43	—12	23.2	1.74
Ithaca	51	—15	25.0	0.83
Le Roy	54	—11	23.8	1.08
Madison Barracks	49	—18	.....	c. 58
Palermo *	47	—13	19.8	1.91
Plattsburg B'ks	40	—16	16.8	0.20
Palmyra *	48	— 8	.....	.....
Setauket	53	2	29.7	3.27
Syracuse	45	— 4	.....	.....
Utica	44	—21	21.4	4.23?
West Point	49	— 9	.....	3.39
White Plains	48	— 4	28.8	10.43†
North Carolina.				
Chapel Hill	72	14	47.2	4.61
Raleigh	72	20	47.0	3.50
Statesville *	64	12	47.0	4.05
Weldon *	73	18	43.1	3.30
Ohio.				
Cleveland	53	— 3	28.5	1.57
College Hill *	56	3	35.5	3.50
Elyria	53	— 4	35.5	1.39
Garrettsville	52	—10	25.7	1.72
Jacksonborough	54	2	28.8	2.15
Lordstown	54	—10	27.4	1.31
Napoleon	51	— 4	26.5	1.21
Ohio—Cont'd.				
North Lewisburg	57	— 1	31.2	1.70
Portsmouth	68	8	36.5	2.62
Ruggles*	52	0	26.7	1.01
Tiffin *	53	1	28.2	1.95
Wauseon	52	— 9	24.7	1.96
Westerville	54	2	30.2	1.16
West Milton	62	1	32.0	2.75
Yellow Springs	54	1	33.1	1.26
Oregon.				
Albany	60	32	44.3	1.26
Bandon *	60	30	45.2	2.69
East Portland*	56	30	.....	2.06
Eola	56	31	45.6	2.08
La Grande	56	30	.....	1.69
Klamath, Fort	61	1	32.2	1.32
McMinnville	60	24	39.3	0.05
Yaquina Lt. House	62	31	43.6	2.94
Pennsylvania.				
Altoona	59	— 2	34.7	1.17
Blooming Grove *	52	—22	.....	1.20
Catawissa	53	— 9	22.0	2.03
Corry *	55	—25	24.8	2.03
Drifton	52	—11	25.2	2.63
Dyberry	47	—31	20.9	3.07
Franklin *	.....	.....	.....	4.08
Germantown	54	— 3	.....	3.92
Grampian Hills	54	—14	25.5	1.73
Meadville	48	4	35.9	.....
Phillipsburg	53	—18	28.1	0.89
Quakertown	50	— 4	27.3	4.26
Reading	48	— 2	29.4	3.50
State College	56	—13	28.5	1.70
Wellsborough *	55	—17	26.3	4.54
West Chester	54	— 1	30.7	4.97
Westtown	51	4	31.2	5.43
South Carolina.				
Cedar Springs	77	15	45.0	6.00
Black's	75	35	.....	4.29
Kirkwood	60	21	45.3	3.24
Stateburg *	72	22	49.8	4.68
Tennessee.				
Ashwood	65	13	39.0	3.31
Austin	68	11	42.3	2.34
Milan	70	14	41.2	1.90
Texas.				
Austin *	80	37	57.4	0.25
Cedar Hill	74	32	.....	7.00
Cleburne *	70	29	47.6	3.80
Comanche	70	26	.....	2.31
Concho, Fort	79	28	50.3	1.98
Decatur	75	24	45.8	3.01
McIntosh, Fort	80	44	62.0	0.93
Mesquite	71	30	47.7	4.92
New Ulm	65	42	54.0	4.66
Ringgold, Fort	88	40	64.2	0.14
Silver Falls	79	23	46.8	1.59
Vermont.				
Burlington	42	—16	18.6	0.79
Brattleborough	45	—17	22.4	4.33
Lunenburg	44	—22	17.7	1.25
Manchester	45	—16	20.7	4.74
Newport *	38	—28	14.6	1.80
Strafford *	44	—16	17.4	2.00
Virginia.				
Bird's Nest *	66	17	40.0	2.55
Christianburg	62	3	.....	2.34
Dale Enterprise*	63	8	41.4	2.63
Marion	60	1	38.0	2.69
Monroe, Fort	68	11	.....	3.75
Petersburg	67	15	47.2	2.94
Rappahannock	68	16	35.4	1.89
Summit*	62	8	35.7	.....
University of Va	54	24	39.2	4.18
Variety Mills	62	10	37.8	3.50
Wytheville	60	4	40.0	2.60
Washington Territory.				
Blakely *	56	19	43.0	2.30
Spokane, Fort	61	22	.....	0.68
Tacoma *	53	31	41.2	2.49
Townsend, Fort	58	29	43.8	1.03
Vashon	62	30	39.9	2.95
Walla Walla, Fort	64	27	44.2	0.32
West Virginia.				
Clarksburg*	60	4	35.0	2.02
Helvetia *	60	3	37.2	2.79
Middlebrook*	50	— 6	30.9	.....
Parkersburg	56	8	34.8	1.72
Wisconsin.				
Beloit	44	—23	17.4	1.12
Delavan	42	—24	17.0	0.87
Embarras *	41	—34	15.6	2.10
Fond du Lac	39	—39	19.0	0.96
Fredonia	50	—26	16.7	.....
Manitowoc	58	—28	18.2	3.60
Madison	42	—25	16.8	1.01
Prairie du Chien	51	—21	18.9	3.50
Waucousta	34	—28	.....	2.05
Wyoming.				
Camp Sheridan	47	— 5	25.8	2.02
Laramie, Fort	63	8	.....	0.68
McKinney, Fort	55	— 4	31.6	1.02
Washakie, Fort	59	2	.....	0.27

† Rainfall apparently wrong; largely excessive.

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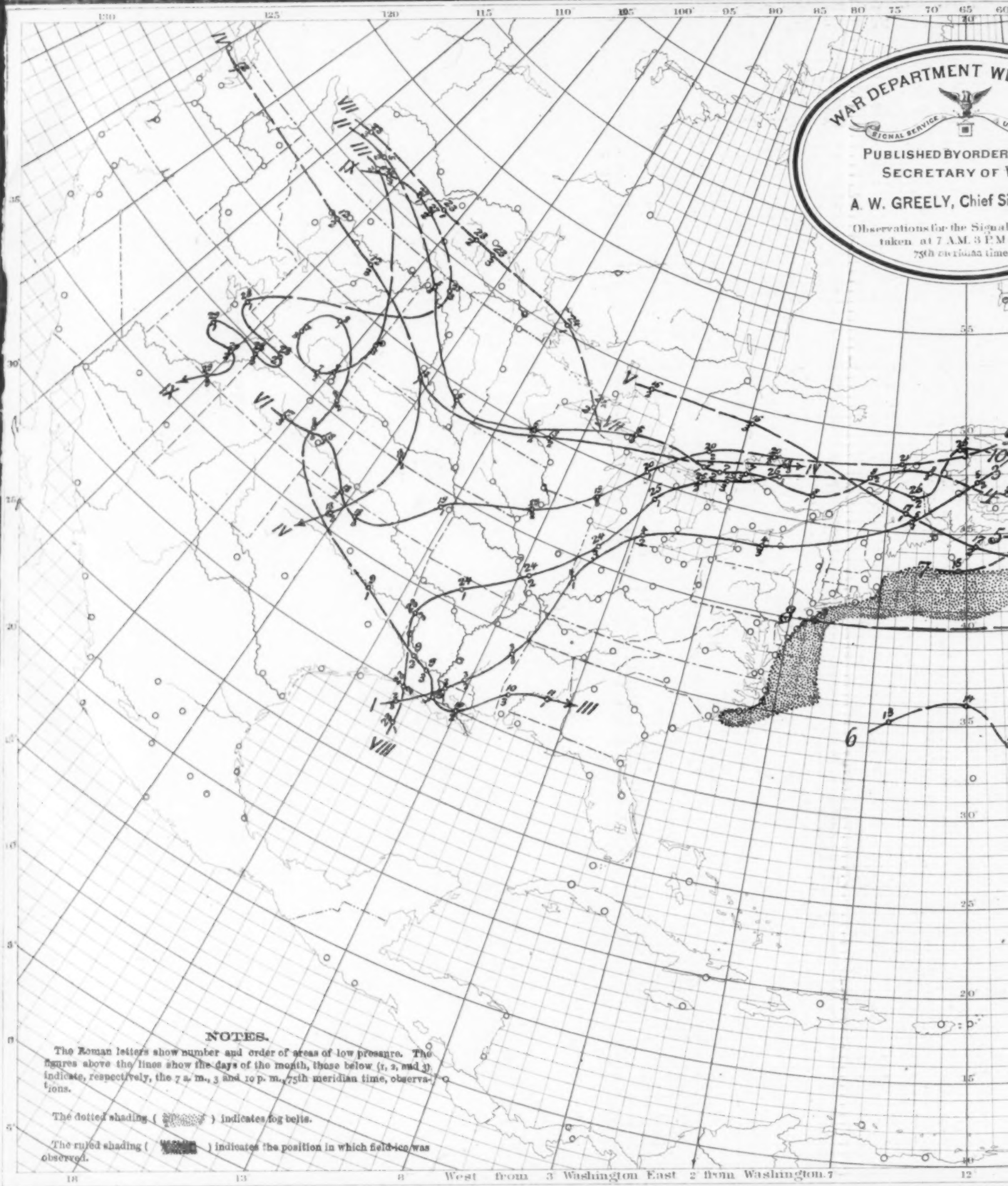
Chart I. Tracks of Areas o

Fig. 106 C 1884.


WAR DEPARTMENT W
SIGNAL SERVICE
PUBLISHED BY ORDER
SECRETARY OF
A. W. GREELY, Chief Si
Observations for the Signal
taken at 7 A.M. 3 P.M
75th meridian time
NOTES.
The Roman letters show number and order of areas of low pressure. The figures above the lines show the days of the month, those below (1, 2, and 3) indicate, respectively, the 7 a. m., 3 and 10 p. m., 75th meridian time, observations.
The dotted shading ( ) indicates fog belts.
The ruled shading ( ) indicates the position in which field-ice was observed.
West from Washington
East from Washington

eas of Low Pressure. February, 1888.

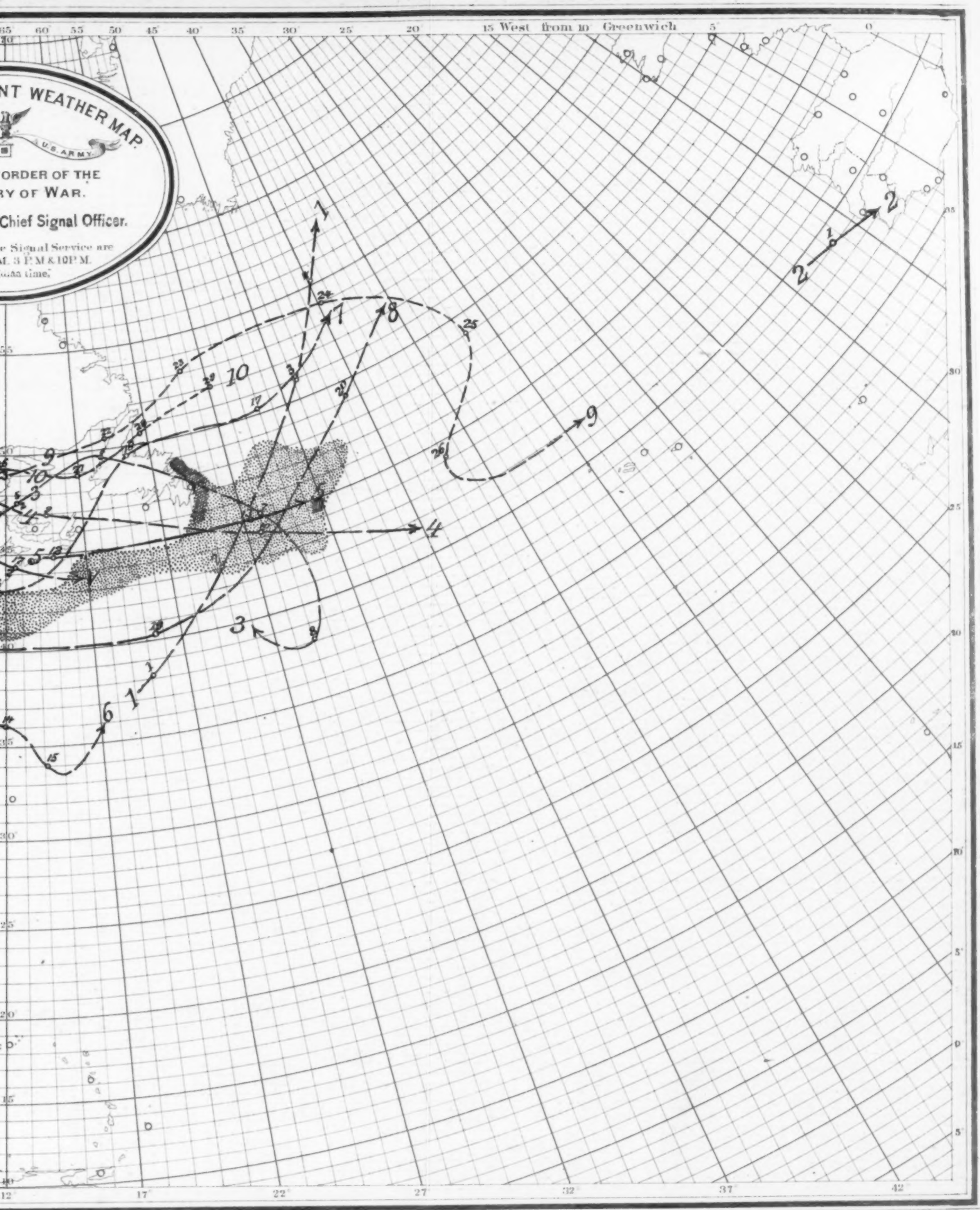
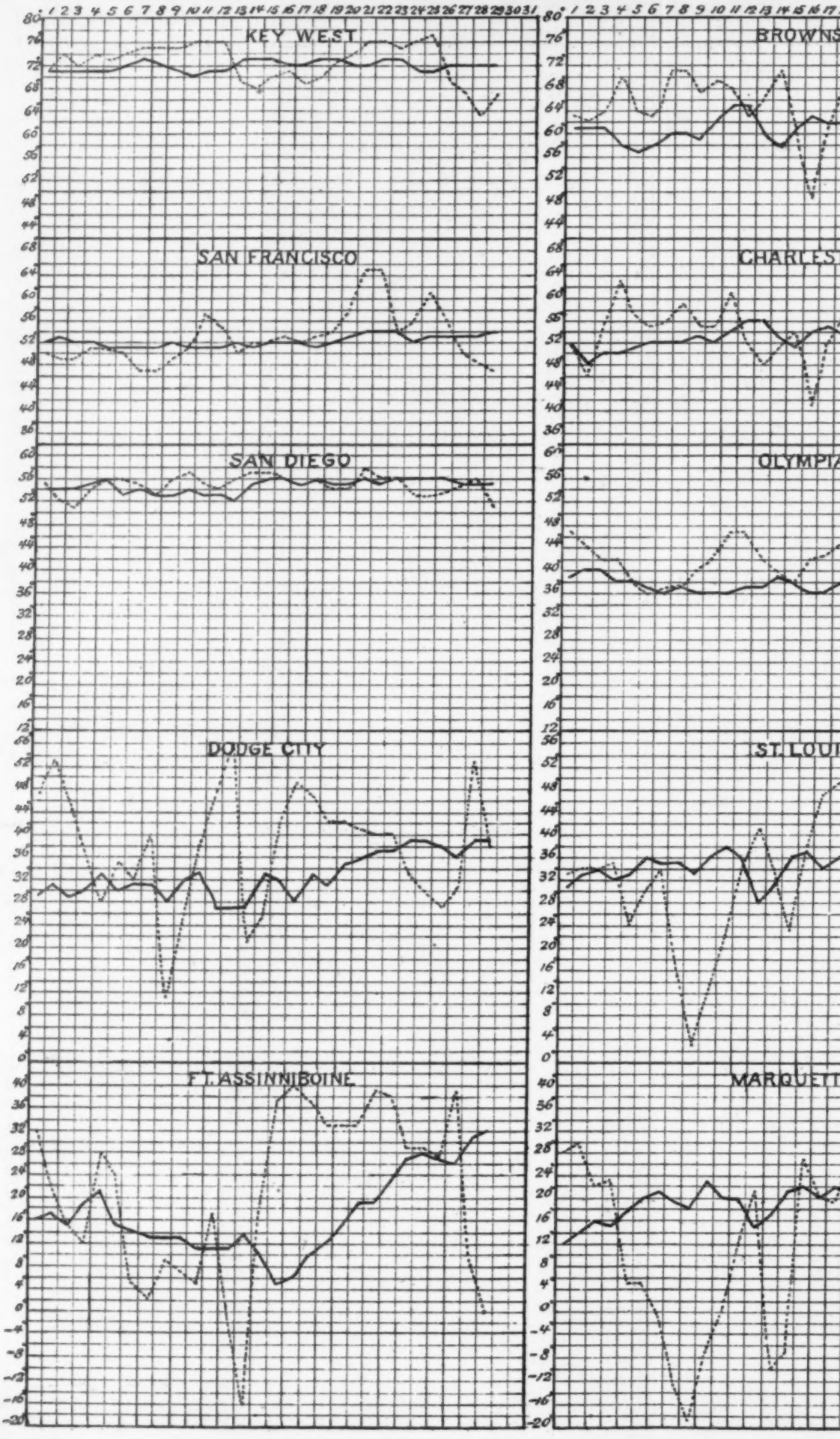
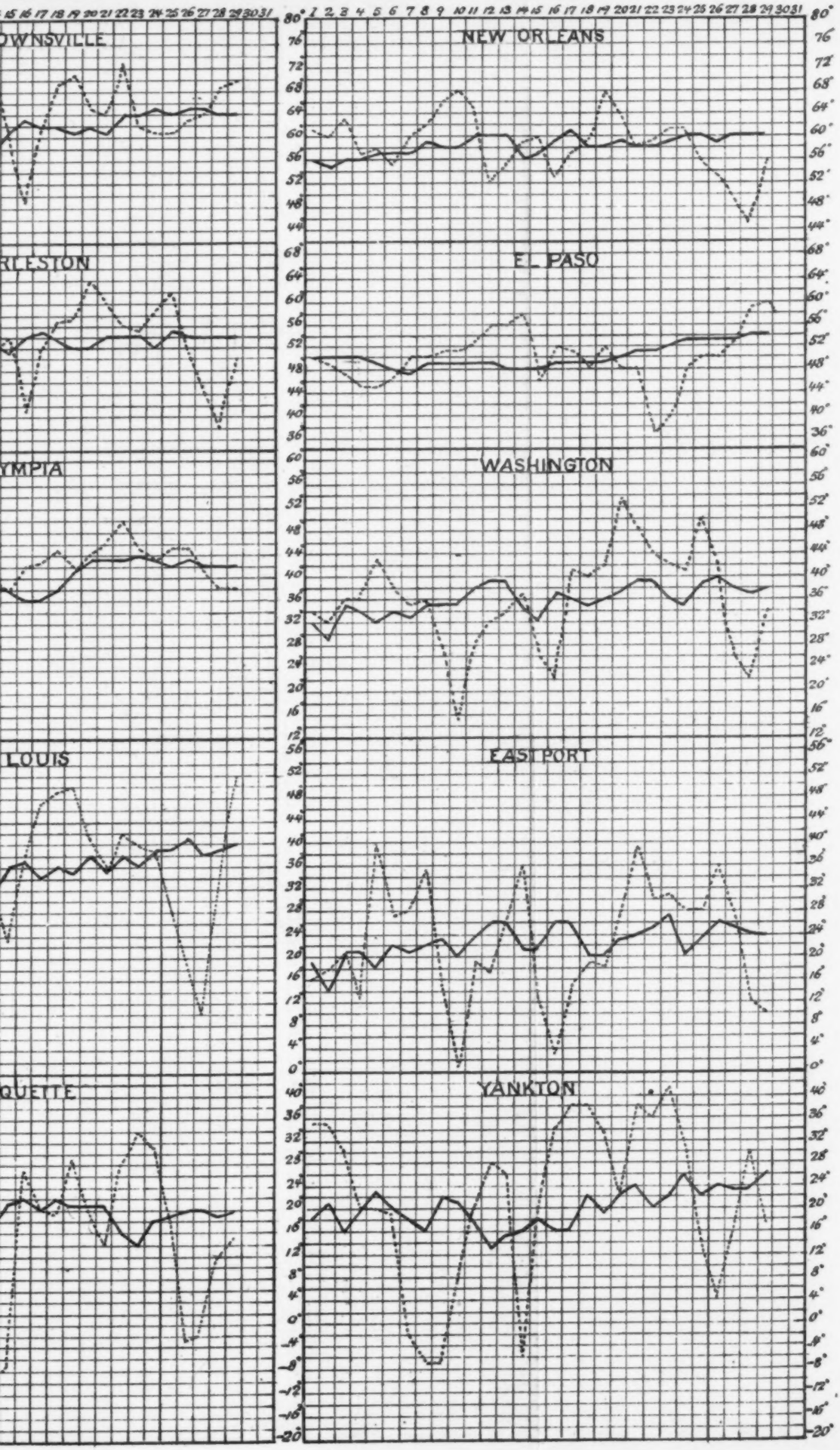


Chart III. Normal February temperatures for a number of yea

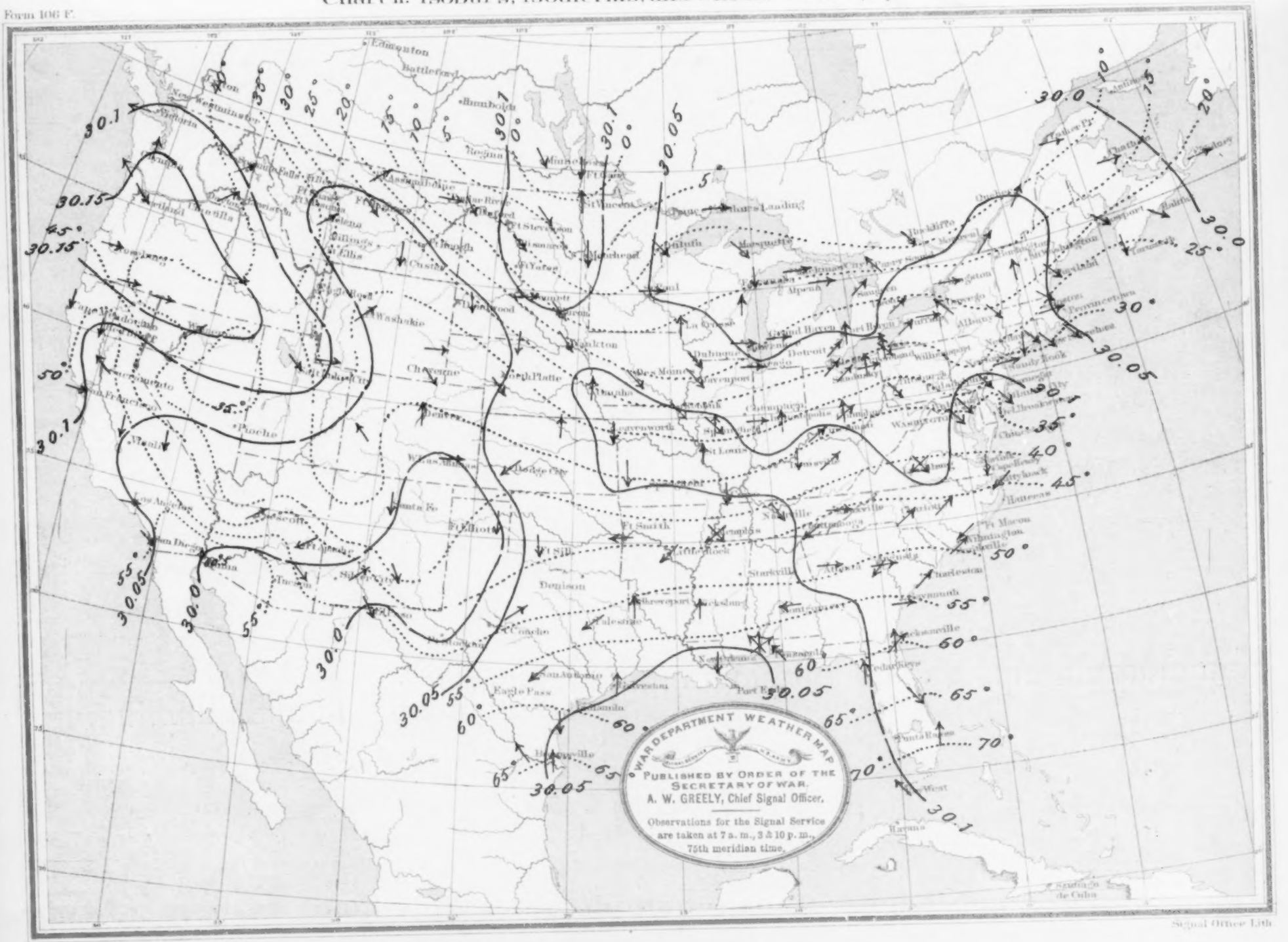


of years [———]. Mean temperature for February, 1888 [--------].



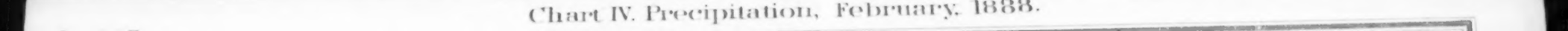
Form 106 F.

Chart II. Isobars, Isotherms, and Winds. February, 1888.


WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 7 a. m., 3 & 10 p. m., 75th meridian time.

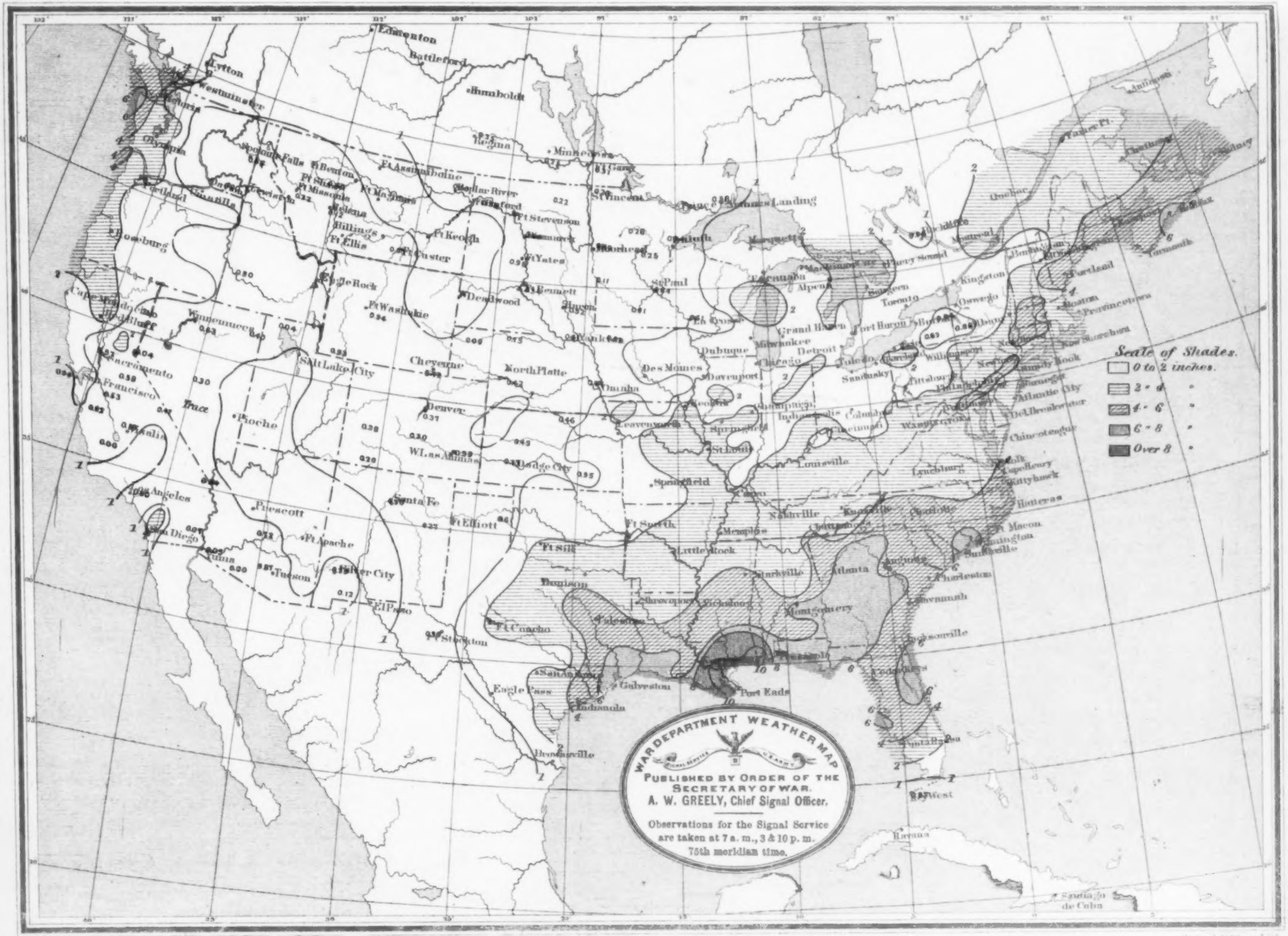
Signal Office Lith

Chart IV. Precipitation, February. 1888.



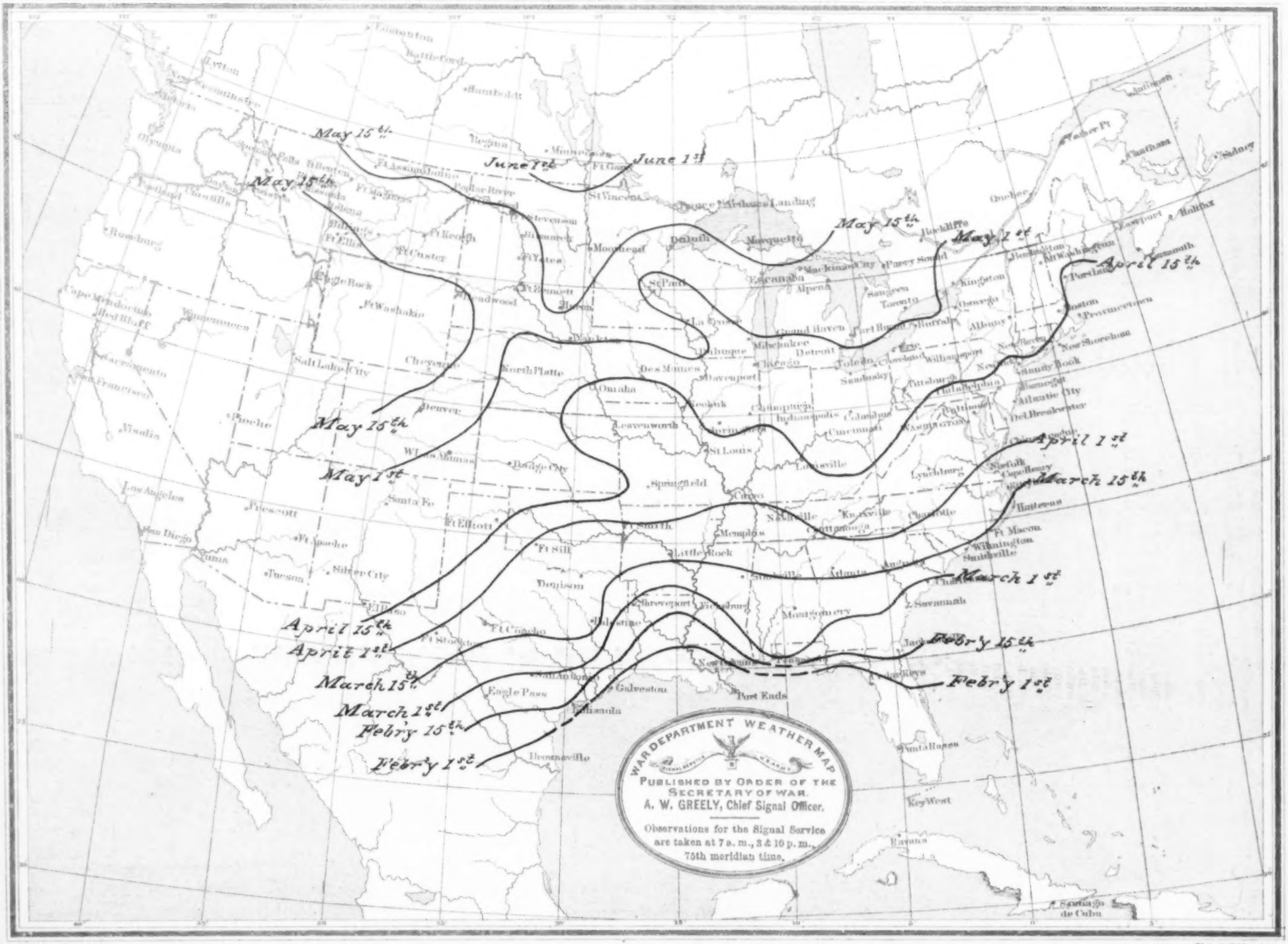
Form 106 F.

Chart IV. Precipitation, February, 1888.


WAR DEPARTMENT WEATHER MAP
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
A. W. GREELY, Chief Signal Officer.
Observations for the Signal Service are taken at 7 a. m., 3 & 10 p. m. 75th meridian time.
Scale of Shades.
0 to 2 inches.
2 " 4 "
4 " 6 "
6 " 8 "
Over 8 "

Form 106 F.

Chart V. Average date of last killing frost determined from data since the opening of Signal Service stations.



Signal Office Lith.

List of voluntary stations of the Signal Service, with their respective observers, from which meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for February, 1888.

Place of observation and observer.

Alabama.

Livingston, J. W. A. Wright.
New Market, Dr. Geo. D. Norris.

Arizona.

Tucson, Edward L. Wetmore.

Arkansas.

Eureka Springs, A. H. Foote.
Lead Hill, Silas C. Turnbo.

California.

Anderson, Dr. A. Fouch.
Banning, Welwood Murray.
East Pasadena, A. L. Downing.
Georgetown, C. M. Fitzgerald.
Hydesville, E. T. Foss.
Nicolaus, Alvah Pendleton.
Oakland, Dr. J. B. Trembley.
Oroville, Hiram Arents.
Riverside, A. K. Holt.
Salinas, Dr. E. K. Abbott.
Sacramento, S. H. Gerrish.
Santa Barbara, H. D. Vail.
Santa Maria, L. E. Blochman.
Visalia, John Tuohy.
Willows, David Bentley.

Colorado.

Bennett, I. S. Putnam.
Fort Collins, Elwood Meade.
Grand Junction, Frank McClintock.

Connecticut.

Hartford, Wm. R. Matson.
New Hartford, Wm. Goodwin.
Southington, Luman Andrews.
Voluntown, Rev. E. Dewhurst.

Dakota.

Garden City, W. C. T. Newell.
Goddard, Mrs. M. F. Goddard.
Highmore, W. R. McDowell.
Kimball, A. S. Stuver.
Parkston, John J. Swartz.
Richardton, Prof. A. Nordberg.
Webster, Prof. Arthur Betts.

District of Columbia.

Kendall Green, Deaf and Dumb Institute.
Receiving Reservoir, Distributing Reservoir, Rock Creek Bridge } Washington Aqueduct.

Florida.

Alva, Chas. E. Robbins.
Archer, Dr. J. C. Neal.
Duke, B. P. Ferrill.
Fort Meade, A. H. Adams.
Homeland, J. S. Wade.
Limona, J. G. Knapp.
Manatee, Mrs. Mary W. Broberg.
Merritt's Island, Rev. J. H. White.
Tallahassee, Rev. Dr. W. H., Carter.

Georgia.

Athens, Prof. L. H. Charbonnier.
Forsyth, Thos. G. Scott.
Marietta, Philip A. Cobb.
Milledgeville, S. A. Cook.
Quitman, J. L. Cutler.

Idaho.

Lewiston, Robert Schleicher.

Illinois.

Charleston, J. B. Dazey.
Collinsville, Dr. J. L. R. Wadsworth.
Jacksonville, P. J. Hasenstat.
Oswego, John S. Seely.
Palestine, John E. Templeton.
Pekin, Rev. J. E. Terborg.
Rockford, T. D. Robertson.
Sycamore, Roswell Dow.
Sandwich, Dr. N. E. Ballou.
South Evanston, Dr. M. D. Ewell.

Indiana.

Butlerville, C. F. Hole.
Dana, John S. Wright.
Jeffersonville, J. C. Loomis.
Laconia, Lafe Crozier.
Logansport, Thos. B. Helm.
Mauzy, Elwood Kirkwood.
New Providence, E. S. Hallett.
Sunman, B. F. Ferris.
Vevay, Prof. Chas. Boerner.

Iowa.

Ames, J. Rush Lincoln.
Auburn, Edwin Miller.
Bancroft, H. N. Renfrew.
Cedar Rapids, H. D. Olds.
Cedar Rapids, F. W. Fleming.
Marinda, A. S. Van Sandt.
Clear Lake, Dr. J C. Wright.
Clinton, Luke Roberts.

Place of observation and observer.

Iowa—Con.

Cresco, Gregory Marshall.
Cromwell, E. E. Harrison.
Denmark, G. B. Brackett.
Des Moines, Adolphus Voegeli.
Dysart, Jos. Dysart.
Elkader, J. N. Hamilton.
Fairfield, Geo. D. Clark.
Fort Madison, Miss L. A. McCready.
Glenwood, Seth Dean.
Glenwood, A. Schappel.
Humboldt, Miss. Florence Prouty.
Independence Emil F. Wülfke.
Logan, Jacob T. Stern.
Manson, W. L. Thompson.
Maquoketa, A. B. Bowers.
Monticello, H. D. Smith.
Mount Vernon, Prof. Alonzo Collin.
Muscatine, J. P. Walton.
Osage, G. D. Pettingill.
Osceola, F. M. Kyte.
Oskaloosa, Joseph Boyd
Oskaloosa, O. H. Avey.
Sac City, Dr. Caleb Brown.
Sac City, Sidney Smith.
Smithland, Dr. Chas. Rice.
Washington, Wm. A. Cook.
Webster City, Elon Lee.
Wesley, Wm. Ward.
West Bend, J. H. Warren.

Kansas.

East Norway, P. L. Gray.
Elk Falls, Dr. A. C. Williams.
El Dorado, H. C. Ford.
Globe, Wm. Featherston.
Independence, J. M. Altaffer.
Lawrence, Prof. F. H. Snow.
Manhattan, C. P. Blachley.
Marydale Farm, T. B. Jennings.
Morse, R. P. Edgington.
Ninnescah, E. Shaw.
Salina, J. H. Gibson.
Tribune, S. B. Jackson.
Wakefield, Wm. P. Cochran
Wellington, John H. Wolfe.
Wilson, E. Y. Dollenmayer.
Yates Centre, F. R. Gray.

Kentucky.

Bowling Green, M. H. Crump.
Carlisle, W. H. Fritts.
Elkin, Chas. Ogden.
Frankfort, E. C. Went.

Louisiana.

Grand Coteau, Rev. C. M. Widman, S. J.
Liberty Hill, E. A. Crawford.
Luling, F. M. Rogers.

Maine.

Bar Harbor, Joseph Wood.
Cornish, Silas West.
Gardiner, Rev. Charles L. Wells.
Orono, Prof. M. C. Fernald.
Skowhegan, William A. Whitney.

Maryland.

Cumberland, E. T. Shriver.
Fallston, G. G. Curtiss.
Great Falls, Washington Aqueduct.
McDonogh, McDonogh Institute.
Mount St. Mary, M't St. Mary's College.
New Midway, George F. Smith.
Woodstock, Woodstock College.

Massachusetts.

Amherst, Miss S. C. Snell.
Amherst, Massachusetts Agricultural Experimental Station.
Blue Hill, Rev. A. K. Teele.
Blue Hill Observatory, A. L. Rotch.
Cambridge, Harvard College Observatory.
Dudley, Conant Observatory.
Deerfield, Rev. A. Hazen.
Fall River, C. V. S. Remington.
Heath, B. B. Cutler.
Marion, J. E. Hadley.
New Bedford, Thomas R. Rodman.
Newburyport, T. V. Pike.
Provincetown, John R. Smith.
Somerset, Elish Slade.
Taunton, Dr. E. U. Jones.
Westborough, G. S. Newcomb.
Williamstown, Williams College Observatory.
Worcester, J. B. Hall.

Michigan.

Kalamazoo, W. A. Black.
Lansing, Dr. H. B. Baker.
Marshall, W. T. Drake.

Place of observation and observer.

Michigan.—Con.

Mottville, J. A. Hartzler.
Traverse City, S. E. Wait.

Minnesota.

Minneapolis, Wm. Cheney.

Mississippi.

Biloxi, Dr. R. G. Hinsdale.
Palo Alto, W. H. Hill.

Missouri.

Conception, Rev. M. Eckstein.
Frankford, W. W. Vermillion.
Pierce City, J. J. Spilman.
Warrenton, Prof. J. H. Frick.

Montana.

Virginia City, Eugene Stark.

Nebraska.

Brownville, G. D. Carrington.
De Soto, Chas. Seltz.
Fairbury, Dr. J. Humphrey.
Fremont, Rev. L. F. Berry.
Genoa, Geo. S. Truman.
Hay Springs, Wm. Waterman.
Kimball, Wm. G. Barton.
Lincoln, University of Nebraska.
Marquette, John Ellis,
Tecumseh, W. L. Dunlap.

Nevada.

Carson City, Chas. W. Friend.

New Hampshire.

Antrim, Frank W. Palmer.
Berlin Mills, Q. A. Bridges.
Concord, W. L. Foster.
Nashua, Chas. H. Webster.
Ashland, Belmont, Bristol, Lake Village, Weir's Bridge, Wolfeborough, } Lake Winipiseogee Cotton and Woolen Manufacturing Co.

New Jersey.

Beverly, C. F. Richardson.
Clayton, W. T. Wilson.
Egg Harbor City, H. Y. Postma.
Moorestown, Thos. J. Beans.
Readington, John Fleming.
South Orange, Dr. W. J. Chandler.
Vineland, Dr. O. H. Adams.

New Mexico.

Gallinas Spring, J. E. Whitmore.
Las Vegas, F. W. Chatfield.

New York.

Ardenia, Richard B. Arden.
Auburn, Geo. Casey.
Boyd's Corners, Thomas Manning.
Brooklyn, Prof. W. C. Peckham.
Cooperstown, G. Pomeroy Keese.
Factoryville, T. P. Yates.
Friendship, Jesse D. Rodgers.
Geneva, Mrs. C. K. M. Yates.
Humphrey, Chas. E. Whitney.
Ithaca, Cornell University.
LeRoy, Prof. F. M. Comstock.
Menands, C. B. Tillinghast.
Palmyra, L. D. Cummings.
Penn Yan, Geo. R. Young.
Saratoga Springs, Felix Thomas.
Setauket, Selah B. Strong.
Starkey, Henry L. Jennison.
Syracuse, J. F. Boynton.
Utica, Thomas Birt.
Vermillion, E. B. Bartlett.
White Plains, Prof. O. R. Willis.
Worcester, John W. Bush.

North Carolina.

Chapel Hill, Prof. J W. Gore.
Hot Springs, Dr. C. F. McGahan.
Lenoir, Dr. R. L. Beall.
Raleigh, Thos. C. Harris.
Statesville, W. A. Eliason.
Weldon, T. A. Clark.

Ohio.

Cleveland, G. A. Hyde.
College Hill, John W. Hammitt.
Elyria, C. W. Goodspeed.
Garrettsville, S. M. Luther.
Jacksonborough, Dr. J. B. Owsley.
Lordstown, W. S. Dean.
Napoleon, Dr. T. C. Hunter.
New Athens, T. M. Sewell.
North Lewisburg, H. D. Gowey.
Portsmouth, Dr. D. B. Cotton.
Ruggles, Peter Bowman.
Tiffin, Rev. T. H. Sonedecker.
Wauseon, Thos., Mikesell.
Westerville, Prof. John Haywood.
West Milton, Luke S. Motte.

Place of observation and observer.

Ohio.—Con.

Yellow Springs, Chas. W. Rice.

Oregon.

Albany, John Briggs.
Bandon, Geo. Bennett.
East Portland, Dr. Geo. Wigg.
Eola, Thos. Pearce.
La Grande, J. K. Romig.
McMinnville, Prof. W. J. Crawford.
Yaquina L. H, Dr. John G. Jessup.

Pennsylvania.

Altoona, Chas. B. Dudley.
Blooming Grove, John Grathwohl.
Corry, Wm. Loveland.
Drifton, H. D. Miller.
Dyberry, Theo. Day.
Easton, Dr. J. W. Moore.
Franklin, Joseph Bell.
Germantown, Thomas Meehan.
Grampian Hills, Nathan Moore.
Indiana, McLean W. Davis.
Meadville, David Logan.
Phillipsburg, L. Ray Morgan.
Quakertown, J. L. Heacock.
Reading, C. M. Dechant.
State College, Agricultural Experimental Station, State College.
Troy, M. Gustin.
Wellsborough, Hiram D. Deming.
West Chester, Dr. Jesse C. Green.
Westtown, Wm. F. Wickersham.

South Carolina.

Black's, Jos. Black.
Cedar Springs, J. T. Bayerly.
Kirkwood, Colin Macrae.
Stateburg, Dr. W. W. Anderson.

Tennessee.

Ashwood, Rev. C. F., Williams.
Milan, Dr. M. D. L. Jordan.

Texas.

Austin, Oscar Samostz.
Cedar Hill, J. P. Berry.
Cleburne, Dr. T. C. Osborn.
Comanche, E. N. Wiesendanger.
Corsicana, W. H. Hamilton.
Decatur, H. D. Donald.
Mesquite, Silas G. Lackey.
Midland, J. C. Rathburn.
New Ulm, C. Runge.
Silver Falls, C. M. Tilford.

Vermont.

Brattleborough, W. H. Child.
Burlington, W. B. Gates.
Lunenburg, Dr. Hiram A. Cutting.
Manchester, Rev. E. P. Wild.
Newport, M. B. Thrasher.
Strafford, H. F. J. Scribner.

Virginia.

Bird's Nest, C. R. Moore.
Christianburg, H. D. Walters.
Dale Enterprise, L. J. Heatwole.
Marion, A. T. Lincoln.
Petersburg, J. M. Colson.
Rappahannock, W. H. Ireland.
Summit, J. R. Sim.
University of Virginia, James Wearmouth.
Variety Mills, J. H. Micklem.
Wytheville, Howard Shriver.

Washington Territory.

Blakeley, R. M. Hoskinson.
Tacoma, E. N. Fuller.
Vashon, Ferd A. Carpenter.

West Virginia.

Clarksburg, R. T. Lowndes.
Helvetia, Dr. C. T. Stucky.
Middlebrook, S. F. H. Hewit.
Parkersburg, T. G. Field.

Wisconsin.

Beloit, Beloit College Observatory.
Delavan, George L. Collie.
Embarras, J. E. Breed.
Fond du Lac, J. C. Wedge.
Fredonia, B. H. Meyer.
Lancaster, Edward Pollock.
Madison, Washburn Observatory.
Manitowoc, Miss Clasina Lüps.
Prairie du Chien, College of the Scared Heart.
Waucousta, G. H. Yapp.

Foreign.

Grand Turk, W. Indies, Geo. I. Gibbs.
Leon, Mexico, Prof. M. Leal.
Mount Forest, Canada, Wm. Wylie.
New Westminster, B.C., Capt. Adolphus Peele,

Military posts from which meteorological reports were received, through the Surgeon General of the Army, in time to be used in the preparation of the Monthly Weather Review for February, 1888.

Alabama.
Mount Vernon B'ks.
Arizona.
Huachuca, Fort.
McDowell, Fort.
Mojave, Fort.
Arkansas.
Hot Springs.
California.
Alcatraz Island.
Angel Island.
Benicia Barracks.
Bidwell, Fort.
California—Con.
Gaston, Fort.
Mason, Fort.
Presidio of San F.
Colorado.
Lewis, Fort.
Dakota.
A. Lincoln, Fort.
Meade, Fort.
Pembina, Fort.
Randall, Fort.
Sisseton, Fort.
Sully, Fort.
Dakota—Con.
Totten, Fort.
Yates, Fort.
Florida.
Staint Francis B'ks.
Idaho.
Boisé Barracks.
Sherman, Fort.
Indian Territory.
Gibson, Fort.
Reno, Fort.
Supply, Fort.
Kansas.
Hays, Fort.
Riley, Fort.
Maryland.
McHenry, Fort.
Michigan.
Brady, Fort.
Minnesota.
Snelling, Fort.
Montana.
Keogh, Fort.
Missoula, Fort.
Shaw, Fort.
Nebraska.
Niobrara, Fort.
Robinson, Fort.
Sidney, Fort.
Nevada.
McDermit, Fort.
New Mexico.
Bayard, Fort.
Selden, Fort.
Union, Fort.
Wingate, Fort.
New York.
Columbus, Fort.
Madison Barracks.
Niagara, Fort.
Plattsburg Barracks.
West Point.
Oregon.
Klamath, Fort.
Texas.
Concho, Fort.
McIntosh, Fort.
Ringgold, Fort.
Virginia.
Monroe, Fort.
Washington Ter.
Spokane, Fort.
Townsend, Fort.
Walla Walla, Fort.
Wyoming.
Laramie, Fort.
McKinney, Fort.
Sheridan, Camp.
Washakie, Fort.

State weather services from which meteorological reports were received in time to be used in the preparation of the Monthly Weather Review for February, 1888.

Alabama, P. H. Mell, jr., Signal Corps, director, Auburn, Ala.
Arkansas, W. U. Simons, Pvt. Signal Corps, Little Rock, Ark.
Colorado, Prof. F. H. Loud, director, Colorado Springs, Colo.
Illinois, Col. Charles F. Mills, director, Springfield, Ill.
Indiana, Prof. H. A. Huston, director, Lafayette, Ind.
Kansas, Prof. J. T. Lovewell, director, Topeka, Kans.
Louisiana, R. E. Kerkam, Sgt., Signal Corps, director, New Orleans, La.
Michigan, N. B. Conger, Sgt., Signal Corps, director, Lansing, Mich.
Minnesota, Prof. W. W. Payne, director, Northfield, Minn.
Mississippi, Prof. R. B. Fulton, director, University, Miss.
Missouri, Prof. F. E. Nipher, director, Saint Louis, Mo.
Nebraska, Prof. G. D. Swezey, director, Crete, Nebr.
Nevada, Prof. Chas. W. Friend, director, Carson City, Nev.
New England, Prof. W. H. Niles, President, Boston, Mass.
New Jersey, Prof. George H. Cook, director, New Brunswick, N. J.
North Carolina, Dr. Herbert Battle, director, Raleigh, N. C.
Ohio, Prof. Benj. F. Thomas, director, Ohio State University, Columbus, Ohio.
Oregon, B. S. Pague, Sgt., Signal Corps, Roseburg, Oregon.
Pennsylvania, under direction of Franklin Institute, Philadelphia, Pa.
South Carolina, Hon. A. P. Butler, director, Columbia, S. C.
Tennessee, J. D. Plunket, M. D., director; H. C. Bate, assistant, Nashville, Tenn.

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